Qsee®
simplicity - quality - technology

User Manual

QC SERIES

H.264 NETWORK DVRs

Variable CIF and D1 Recording Options

Thank You for Choosing a Q-See Product!

All of our products are backed by a conditional service warranty covering all hardware for 12 months from the date of purchase. Additionally, our products also come with a free exchange policy that covers all manufacturing defects for one month from the date of purchase. Permanent upgrading service is provided for the software and is available at www.Q-See.com.

Be certain to make the most of your warranty by completing the registration form online. In addition to warranty and technical support benefits, you'll receive notifications of product updates along with free downloadable firmware updates for your DVR. Register today at www.Q-See.com!

Please see the back of this manual for exclusions.

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Manufacturer shall not be liable for any damages whatsoever from misuse of this product.

About this Manual

This manual is written for the QC series of DVRs and was accurate at the time it was completed. However, because of our ongoing effort to constantly improve our products, and the different capabilities of the three models additional features and functions may have been added since that time and on-screen displays may change. We encourage you to visit our website at www.Q-see.com to check for the latest firmware updates and product announcements.

This manual covers the setup and local operation of the DVR. Instructions for configuring the DVR for remote access, along with instructions for monitoring the DVR using a computer or mobile device, are contained within the **Remote Monitoring Guide** which is included on the CD that accompanied your DVR and which can also be found on ***www.Q-See.com/support***.

Throughout the manual we have highlighted warnings and other important information that will assist you in operating your new system in a safe and trouble-free manner. Please take the time to read and follow all instructions and pay attention to alerts as shown below:

IMPORTANT! Red boxes with this icon indicate warnings. To prevent possible injury or damage to the product, read all warnings before use.

NOTE! Text in blue boxes with the Information icon offer additional guidance and explanations about how to make the most out of your system.

Version 1.5 7/31/13

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INTRODUCTION CHAPTER 1

To prevent damage to your Q-See product or injury to yourself or to others, read and understand the following safety precautions in their entirety before installing or using this equipment. Keep these safety instructions where all those who use the product will read them.

WARNING! ELECTRIC SHOCK RISK!

- Check the unit and any accessories included in the package immediately after opening. If items are missing or damaged, repackage and return to the point of purchase.
- Use the proper power source. Only use the power adapter supplied with your system. Do not use this product with a power source that applies more than the specified voltage (100-240V AC).
- Never insert anything metallic into the DVR. Inserting anything into the DVR or its case can be a source of dangerous electric shock.
- Do not operate in dusty areas. Avoid placing the DVR in places that are dusty.
- Do not expose this product to rain or use near water. If this product accidentally gets wet, unplug it and contact an authorized dealer immediately.
- Keep product surfaces clean and dry. To clean the outside case of the DVR, gently wipe using a lightly dampened cloth (only use water, do not use solvents).
- Do not operate this DVR without the cover securely in place. Do not attempt to do any repairs to the DVR yourself. If there are unusual sounds or smells coming from the DVR, unplug it immediately and contact Q-See technical support. Under no circumstances should the cover be removed while the device is connected to a power source. You should only remove the cover to install/replace the hard disk drive (**See Chapter 6**) or replace the standard 3v lithium cell battery on the motherboard. These are the only user serviceable parts. You may need to replace the battery if the internal clock resets itself after a power outage
- Handle DVR box carefully. If you accidentally drop your DVR on any hard surface, it may cause a malfunction. If the DVR doesn't work properly due to physical damage, contact an authorized dealer for repair or exchange.
- Make sure there is proper air circulation around the unit. This DVR system uses a hard drive for video storage which generates heat during operation. Do not block air holes located on the bottom, top, sides and back of the DVR as they are designed to keep the system cool while running. Install or place this product in an area where there is ample air circulation.
- Provide proper ventilation. This DVR has a built-in fan that properly ventilates the system. Do not cover or impede this fan.

FEATURES AND SPECIFICATIONS

Your DVR (Digital Video Recorder) contains professional-grade features and flexibility that allows the do-it-yourselfer to easily setup and maintain a reliable and secure security system for home and office.

It uses an embedded Linux OS to maintain stable operation and a popular H.264 compression algorithm to produce high-quality, low bitstream footage that is easy to manage and efficient to transfer over the internet. It can use various functions such as record, playback, and monitoring at the same time and produces audio and video synchronization. This product has advanced network technology and data transmission functions allowing you to control and monitor your system remotely.

This product offers the following features:

Smartphone Compatible

Access live footage directly from your iPhone, or other Smartphone. Your DVR can also be set to e-mail your hand held-device whenever specific activity occurs, such as motion detection.

View Your Video Feed Online with No Additional Service Fees

View your DVR's live or recorded video footage on any Internet accessible computer with Internet Explorer, Apple Safari, Mozilla Firefox and Google Chrome (using IE plug-in).

Stay Notified with Customizable Email Alerts

Set your system up to notify you when an event has occurred at the location you are monitoring. Notification alerts can easily be adjusted to your specifications.

Advanced Motion Detection Activated Recording

Advanced motion detection settings ensure that false alarms are not triggered. The easy to use motion detect set up screen allows you to mask out certain areas which experience heavy movement in order to avoid false alarms and avoid unnecessary record triggering.

Multiple Backup Options

A built-in USB port gives you the option of backing up and transferring your video footage using a flash drive or external USB hard drive. You can also connect to an external CD/DVD writer to burn your file footage right onto a compact disc or DVD disc. Files can also be accessed from your DVR system to a remote computer location by logging on remotely.

Connect to a TV or PC Monitor Easily

This system comes with VGA and BNC video out ports to allow you to connect to a TV or computer monitor for viewing purposes. You can utilize both outputs simultaneously.

Included Mouse and Remote Control

In addition to the front panel button controls, system can also be booted up and shut down using the included remote control or mouse. Mouse operation function supports intelligent operation by enabling copy and paste functions.

Storage Function

Encrypted file format to ensure data security and avoid vicious data modification.

Compression Format

Supports one channel of combined audio and video. Independent hardware decodes the audio and video signal from a single channel to maintain video and audio synchronization.

24/7 Scheduled Recording

Choose which days of the week and hours of the day you want to set your DVR to record or not record.

Multiple Playback Options and Advanced Search Functions

Supports real-time recording on each channel independently. Search through recorded files while you are playing live footage, monitoring through a remote location using a supported internet browsing application and backing up system files. A variety of playback modes include: slow play, fast play, backward play and frame by frame play.

Network Monitoring

Supports network remote real-time monitoring (available bandwidth permitting) and remote record search.

Alarm Activation Function

Several relay alarm outputs enable you to pair your system with an on-site alarm system.

Communication Ports

Standard Ethernet port allows you to access the DVR from a network or the Internet.

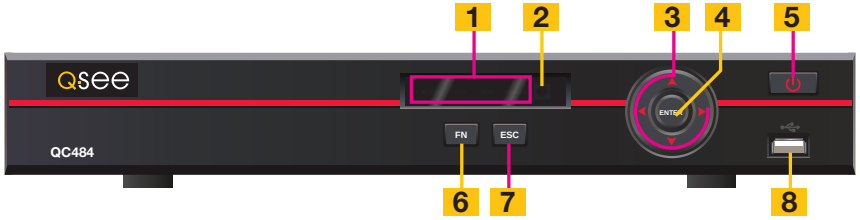
NOTE! Depending on your point of purchase, your DVR may have the hard disk drive already installed. If your drive was packaged separately, or if you wish to upgrade your installed drive up to a 3TB drive, please see Chapter 6 at the back of this manual which covers installing the drive.

CONNECTIONS AND CONTROLS CHAPTER 2

2.1 CONNECTIONS

QC484

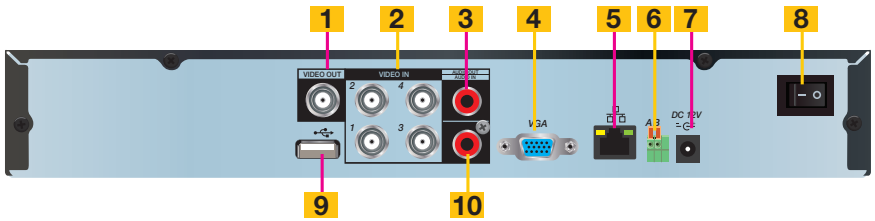
Front Panel



Number	Item	Function
1	Status Lights	Alarm: Not functional on this model Net: Red light indicates that network connection is lost HDD: Red light indicates that hard drive is operating Power: Red light indicates that DVR is powered up
2	IR Sensor	Infrared Receiver for Remote Control
3	Directional Buttons	Navigate through menus. Change selections in pull down menus (Up/Down buttons) Toggle settings (Up/Down buttons)
4	Enter Button	Viewing Mode: Go To Menu In Menu: Acts as mouse click
5	Power Button	Puts DVR into Standby mode or wakes it up.
6	Function Button	Single Channel Viewing Mode: Opens Color Adjustment Virtual Keyboard: Backspace function
7	Escape Button	Exit any menu or current operation
8	USB Port	For use with flash drive when backing up or updating firmware. Not for use with mouse.

If the user is logged out, pressing the **Enter** button will open the **Login** window. Pressing the **Function** button will open the **Virtual Keyboard** which can be navigated using the directional buttons. Click **Enter** to enter a keystroke. Press the **Escape** button to close the **Virtual Keyboard** and then press the **Enter** button to submit your password.

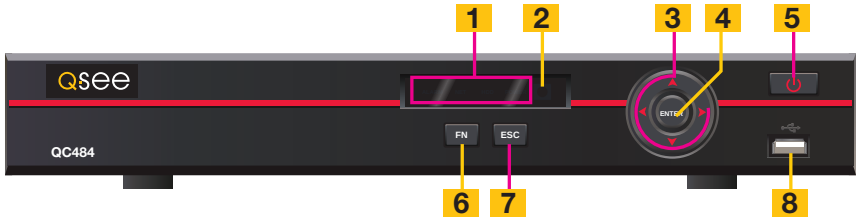
Rear Panel



Number	Item	Function
1	Video Out	BNC Connector to television
2	Video In Ports	BNC Connectors for video feed from cameras (4)
3	Audio Out	RCA Connector for audio output
4	VGA Video Out	To connect to a VGA monitor (19” or larger)
5	Network	Ethernet cable connection to network
6	RS485	Connect the data cables for a PTZ camera into these ports to control it. “A” is positive (+) and “B” is negative (-).
7	Power Input	Connect 12V DC power supply here
8	Power Switch	Turns DVR on or off. Use Shutdown menu function or front panel power button before switching off.
9	USB	Connect the USB mouse to this port
10	Audio In	RCA input for audio feed from microphone

QC448

Front Panel



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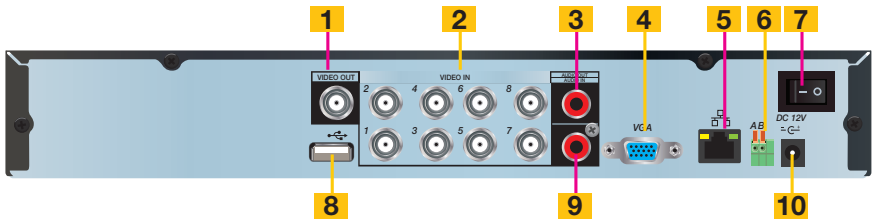
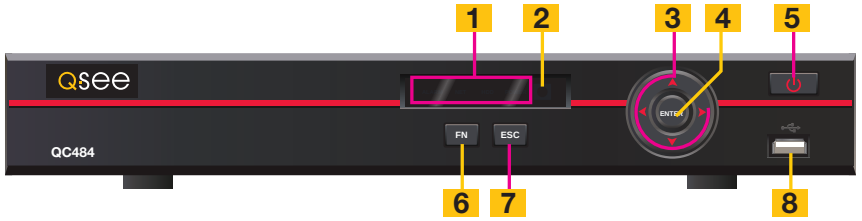
Rear Panel



Number	Item	Function
1	Video Out	BNC Connector to television
2	Video In Ports	BNC Connectors for video feed from cameras (8)
3	Audio Out	RCA Connector for audio output
4	VGA Video Out	To connect to a VGA monitor (19” or larger)
5	Network	Ethernet cable connection to network
6	RS485	Connect the data cables for a PTZ camera into these ports to control it. “A” is positive (+) and “B” is negative (-).
7	Power Switch	Turns DVR on or off. Use Shutdown menu function or front panel power button before switching off.
8	USB	Connect the USB mouse to this port
9	Audio In	RCA input for audio feed from microphone
10	Power Input	Connect 12V DC power supply here

QC4316

Front Panel



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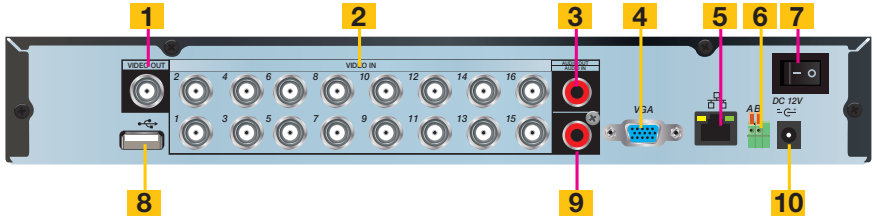
Rear Panel

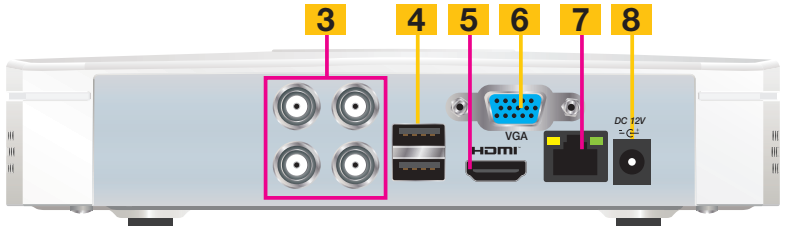


Number	Item	Function
1	Video Out	BNC Connector to television
2	Video In Ports	BNC Connectors for video feed from cameras (16)
3	Audio Out	RCA Connector for audio output
4	VGA Video Out	To connect to a VGA monitor (19” or larger)
5	Network	Ethernet cable connection to network
6	RS485	Connect the data cables for a PTZ camera into these ports to control it. “A” is positive (+) and “B” is negative (-).
7	Power Switch	Turns DVR on or off. Use Shutdown menu function or front panel power button before switching off.
8	USB	Connect the USB mouse to this port
9	Audio In	RCA input for audio feed from microphone
10	Power Input	Connect 12V DC power supply here

QC304

Front Panel

Rear Panel

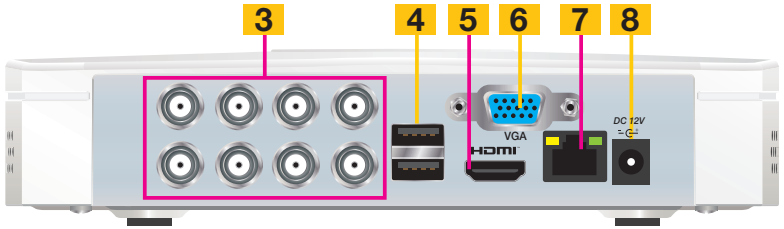


Number	Item	Function
1	Status Lights	These show the status of the network connection, power and hard drive respectively. The Network and Power lights will normally be on. The Hard Drive light will normally be off.
2	USB Port	For use with flash drive when backing up or updating firmware. Not for use with mouse.
3	Video In Ports	BNC Connectors for video feed from cameras (4)
4	USB	Connect the USB mouse to one of these ports
5	HDMI Video Out	To connect to an HD display (21.5” or larger)
6	VGA Video Out	To connect to a VGA monitor (21.5” or larger)
7	Network	Ethernet cable connection to network.
8	Power Input	Connect 12V DC power supply here

QC308

Front Panel

Rear Panel



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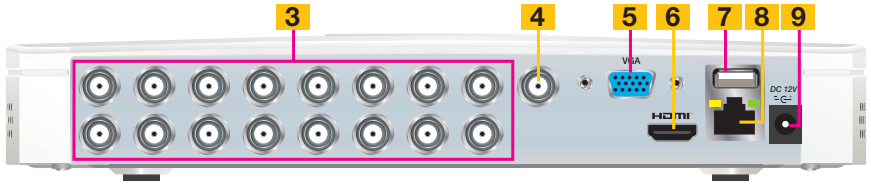
2	USB Port	For use with flash drive when backing up or updating firmware. Not for use with mouse.
3	Video In Ports	BNC Connectors for video feed from cameras (8)
4	USB	Connect the USB mouse to one of these ports
5	HDMI Video Out	To connect to an HD display (21.5” or larger)
6	VGA Video Out	To connect to a VGA monitor (21.5” or larger)
7	Network	Ethernet cable connection to network.
8	Power Input	Connect 12V DC power supply here

QC3016

Front Panel

Rear Panel



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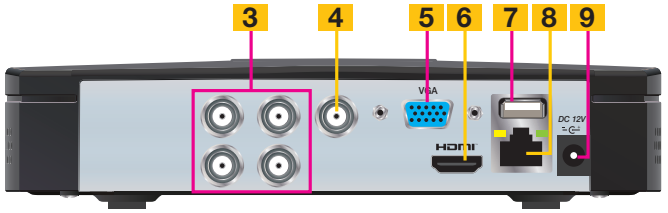
2	USB Port	For use with flash drive when backing up or updating firmware. Not for use with mouse.
3	Video In Ports	BNC Connectors for video feed from cameras (16)
4	Video Out	BNC Connector to television
5	VGA Video Out	To connect to a VGA monitor (21.5” or larger)
6	HDMI Video Out	To connect to an HD display (21.5” or larger)
7	USB	Connect the USB mouse to this port
8	Network	Ethernet cable connection to network.
9	Power Input	Connect 12V DC power supply here

QC524

Front Panel

Rear Panel



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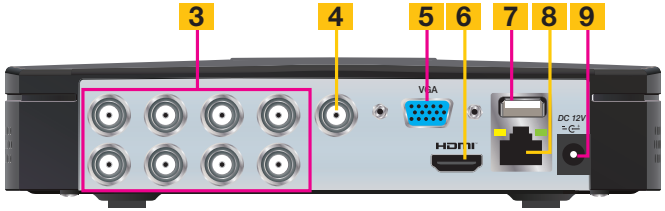
4	Video Out	BNC Connector to television
5	VGA Video Out	To connect to a VGA monitor (21.5” or larger)
6	HDMI Video Out	To connect to an HD display (21.5” or larger)
7	USB	Connect the USB mouse to this port
8	Network	Ethernet cable connection to network.
9	Power Input	Connect 12V DC power supply here

QC588

Front Panel

Rear Panel



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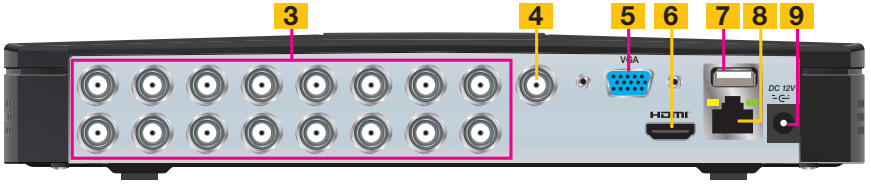
6	HDMI Video Out	To connect to an HD display (21.5” or larger)
7	USB	Connect the USB mouse to this port
8	Network	Ethernet cable connection to network.
9	Power Input	Connect 12V DC power supply here

QC5416

Front Panel

Rear Panel



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7	USB	Connect the USB mouse to this port
8	Network	Ethernet cable connection to network.
9	Power Input	Connect 12V DC power supply here

2.2 MOUSE CONTROL

This DVR can be controlled through the USB mouse, the remote control or by using the buttons on the front panel of the device. We have found that the majority of our customers prefer to operate their DVRs using the USB mouse because of its ease of use and flexibility and our manual is set up with this in mind. The remote control allows you to perform most of the day-to-day functions from a convenient distance. It functions as a typical remote control with additional buttons allowing you to navigate through menus and control functions. We recommend that you configure your DVR using the mouse controls, reserving the remote control for operations such as live viewing, file search and playback.

The mouse operates in a manner similar to how it is used on a conventional computer; point-and-click, right-click, double click and so on. How these functions are used is based on the context of where they are used. Some examples are:

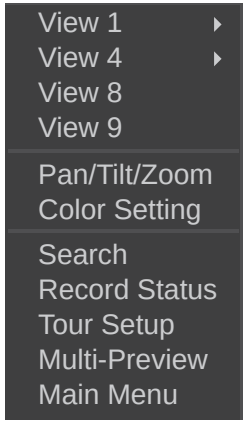
LEFT CLICK:
- Selecting an item
- Opening a menu
- Checking a box or motion detection status
- Selecting letters, numbers or symbols on the virtual keyboard.

DOUBLE CLICK:
- Selecting an event for playback
- Selecting a screen to zoom into from multi-screen mode

RIGHT CLICK

Exits any window. Exits any menu or reopens previous menu.

Opens **Pop-Up Shortcut** Menu. The options available - especially multi-channel viewing options - will vary by model



PICTURE 2-1

MOUSE WHEEL
- Page up or page down
- Switch items in check box
- Increase or decrease numerical value in numerical input box

CLICK-AND-DRAG
- Select motion detection zone
- Select privacy mask zone

VIRTUAL KEYBOARD

Whenever a menu field requires text - such as a password, new user name, or other setting - clicking on that field will bring up the virtual keyboard. It operates as regular keyboard using the point and click function of the mouse to select individual characters. Clicking the shift key allows access to the upper-case characters.

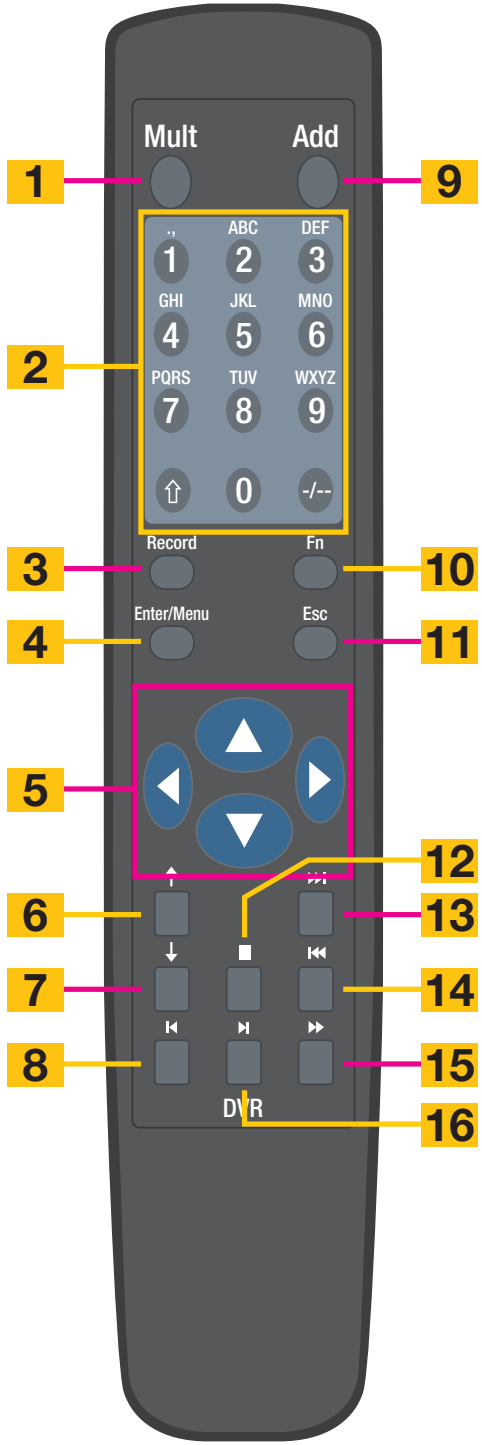
Spaces are entered using the ␣ symbol and characters are deleted with the ← key. Clicking **Enter** or clicking outside of the keyboard will close it.

PICTURE 2-2

2.3 REMOTE CONTROL

The buttons on the Remote Control operate in the same manner as on a conventional DVR remote. Some buttons have multiple functions depending on which menu is being accessed.

Num	Name	Function
1	Multiple-window switch	Switch between multiple-window and one-window view
2	0-9 number key	Input password, channel or switch channel.
3	Record	Start or stop recording manually In record interface, working with the direction buttons to select the channel to record
4	Enter /Menu key	Go to default button Go to the menu
5	Direction keys	Switch current activated control, go to left or right. In playback mode, it is to control the playback process bar.
6	Previous	In playback mode, playback the previous video.
7	Next	In playback mode, playback the next video.
8	Slow Play	Multiple slow play speeds or normal playback.
9	Address	Click to input device serial number
10	Function/Aux Key	In 1-channel monitor mode: pop up assistant function In motion detection interface, functions as a directional key to complete setup Backspace: Press for 1.5 seconds to clear all contents in current text box. In HDD information interface, used to switch between HDD record time and other information Special combined operation in some menus.
11	Escape/Cancel	Go back to previous menu or cancel current operation (close upper interface or control) In playback mode, it goes to real-time monitor mode.
12	Stop	In playback mode, stop current playback.
13	Forward	Various forward speeds and normal speed playback.
14	Backward	Various backward speeds and normal speed playback.
15	Play/Pause	Reverse playback or paused mode, click this button to realize normal playback. In normal playback click this button to pause or resume playback. In real-time monitor mode, click this button to enter video search menu.
16	Fast Forward	Various fast speeds and normal playback.



PICTURE 2-3

2.4 VIDEO DISPLAY

QC-Series DVRs can use a television or a 19" or larger monitor as a main video display. Certain models also provide the option of using a high definition display, such as an HDTV. A video display is not needed for day to day use of your DVR if you are only monitoring it remotely via a mobile device or using a computer, but one is needed for initial setup. It should also be noted that, at present, it is not possible to change settings on the DVR itself using the QC View mobile remote viewing apps and certain settings cannot be changed using the remote monitoring software on the computer.

CONNECTING A VIDEO DISPLAY

Instructions on connecting a desired video display are included in the Quick Start Poster that came with your system but are included here for your convenience.

VGA Monitor

Using a standard VGA monitor - the type used with most computers - with your DVR is the preferred method and the DVR is configured with this in mind. Due to resolution restrictions, you must use a monitor that has at least a 19" diagonal display. This information is typically found on the back of the monitor if you are uncertain.

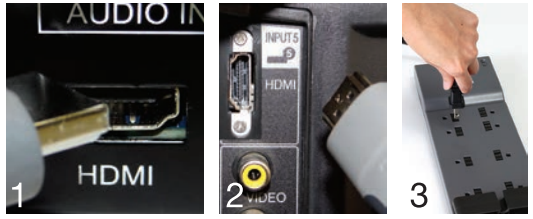
STEP 1. Plug a VGA cable into the port marked "VGA" on the back of the DVR.
STEP 2. Plug the other end of the VGA cable into the similar port on the back of the monitor.
STEP 3. Plug the monitor's power cable into the surge protector.

PICTURE 2-4

High Definition Television

Some QC-Series DVRs include an HDMI video out port allowing you to use a high definition television or other display that has an HDMI video input.

STEP 1. Plug an HDMI cable into the "HDMI" port on the back of the DVR.
STEP 2. Plug the other end into the "HDMI" port on the television.
STEP 3. Plug the television's power cable into a surge protector.



PICTURE 2-5

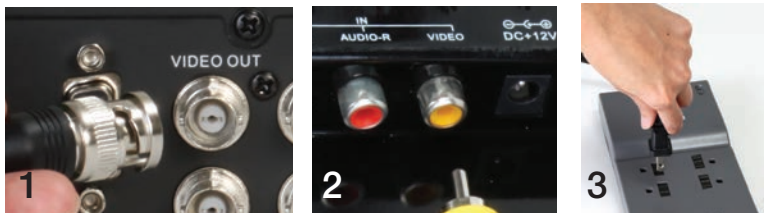
Changing Display Resolution

You can adjust the DVR to optimize its output to best match the capabilities of your monitor or HD display through the following steps:

STEP 1. Open the **Main Menu**.
STEP 2. Click on the **Settings** icon to open the **Settings** window.
STEP 3. Click on the **Display** icon to open the **Display** window
STEP 4. Choose your desired resolution from the **Resolution** pull-down menu.
STEP 5. Click on **Save** to save your settings and then click **Exit**.

Television

A third option for a video display is any television with an RCA video input. The DVR's **Video Out** port uses a BNC type connector for coaxial cable. Depending on model, your DVR may include a BNC-to-RCA cable or adapter. The latter converts the BNC jack to an RCA port allowing you to connect the DVR to the television using a readily available RCA cable.



PICTURE 2-6

STEP 1. Connect a BNC-to-RCA cable to the "Video Out" port on the back of the DVR.
STEP 2. Plug the RCA end into the "Video In" port on the television.
STEP 3. Plug the television's power cable into a surge protector.

2.5 CAMERAS

CONNECTING CAMERAS

Your DVR uses BNC (British Naval Connector) ports to ensure quick and secure connections for your cameras' video cables. While both conventional analog and digital SDI (Serial Digital Interface) high definition cameras use this interface, they cannot be connected to a port intended for the other type because of incompatible signals. It is therefore important to ensure that you are attempting to connect to the proper port.

STEP 1. Connect the BNC and power leads on the camera to the matching connectors on the power and video cable.

NOTE: The male power end fits into the matching power lead on the camera.

STEP 2. Connect the BNC connector on the other end of the cable to any of the Video In ports on the back of the DVR.

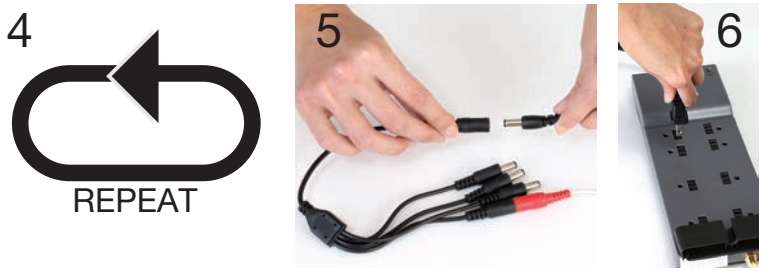
STEP 3. Plug one of the power leads on the power splitter (if your camera kit includes one) into the power lead on the power and video cable. If you are connecting only a single camera, connect the power lead to the power adapter and skip to Step 6, below.

PICTURE 2-7

STEP 4. Repeat for each camera included with your package to ensure proper connection and function.

STEP 5. Connect the single end of the power splitter to the power adapter.

STEP 6. Plug the power adapter into a surge protector. You should now see a live video feed from each of your cameras.



PICTURE 2-8

Some camera bundles may contain more than one camera power supply and splitter. Repeat the steps above as necessary to connect all of your cameras. For bundles containing multiple types of cameras, make sure to connect to the proper power supply as mixing and matching may either cause damage or insufficient power to your cameras.

You may now mount your cameras.

CAMERA PLACEMENT

When installing your camera, it is important to select a proper site not only for field of view, but for other considerations as well:

Distance from viewing/recording device. The further the camera is from the DVR or monitor, the higher the chances of signal degradation. Typical 75Ω Video Cable provides acceptable signal at distances up to 200' (60m). At greater distances, UL-Listed shielded RG59 should be used. The camera's power supply should be located as near to the camera as possible when the distance exceeds 200' as the power level will drop over extended distances resulting in a decrease in video quality.

Do not place near high voltage wires or other sources of electrical interference. Electrical interference will degrade the quality of the signal.

Place camera out of reach to avoid damage.

Avoid direct exposure to weather. Do not place the camera where rain or snow will hit the lens directly nor should the camera be placed so that the sun or bright light shines directly into the lens. Your camera is weatherproof, but it will not work when submerged in water. Ensure that all power and video connections are not directly exposed to water and are protected from the elements.

Indoor cameras should not be used outdoors. Even if they are in a sheltered location, they can still suffer damage due to humidity, dust and other environmental factors. Each camera has an Ingress Protection (IP) rating which defines how protected the internal workings of the camera are from solid objects - such as fingers or bugs - dust and moisture. In an IP rating, there are two numbers that follow the letters "IP." The first represents the protection from solids while the second represents the housing's protection from moisture. A camera should have a minimum rating of IP65 for trouble-free use outdoors.

Mounting surface. The mounting surface must be sturdy and able to hold at least five times the camera's total weight.

Legal Considerations. Always check state and local laws before installing cameras. (2011 NEC 820.44)

Do not place camera behind a window. If there is a light source behind the camera, it can cause a reflection in the window that will obscure events on the other side of the glass. Likewise, the camera's infrared LEDs will reflect off the glass and shine into the lens, thus degrading the image.

Light levels should be approximately the same between camera and target area. A camera in a brightly-lit area looking into a shaded area, or vice versa, may produce inadequate results.

The above are guidelines and the optimal location for your camera will depend on your unique circumstances. As a general rule, the locations highlighted in Green in the picture to the right indicate the best locations to mount your camera. Both locations are sheltered from rain or snow and offer good sight lines to allow your camera to monitor a wide area.

PICTURE 2-9

Because your camera is weatherproof, it requires less protection than weather-resistant cameras and it can be placed in more exposed locations if needed. Keep in mind that most Q-See cameras are designed to operate between 14°F to 122°F (-10°C to 50°) with a relative humidity of up to 95%) and consider wind chill and other environmental factors when selecting your location.

Specialty cameras are also available from Q-See which are able to operate in more extreme environments.

960H CAMERAS

A new standard for analog video cameras, 960H increases the width of the image from D1's 704x480 pixels to 960x 480 pixels. When connected to a DVR with 960H capability, this allows the camera to take advantage of the wider aspect ratios of most monitors and HD screens to deliver a wider, clearer image, without the distortion caused by stretching to fit the screen. This is demonstrated in the image below:

Standard analog camera image stretched to fit HD aspect ratio.

960H camera image.

PICTURE 2-10

You can use 960H cameras with analog DVRs that don't have that technology, but the DVR will be unable take full advantage of the capabilities for best results.

ADDITIONAL CONSIDERATIONS

Most users prefer to operate their systems with the DVRs recording only when motion is detected. This provides the most efficient use of the hard drive's capacity, plus making it easier for a recording to be located. However, if the a camera's location has a lot of "environmental" motion, such as a fan, wind, or the like, you will receive a lot of "false alarms." Usually, these events can be avoided by simply adjusting the placement of the camera. Other situations may require some fine-tuning of your settings. **Chapter 7 Alarms**, covers these settings in detail, but some easily avoidable situations are presented below:

TV/Computer Screens. If the camera can see a video screen, it will trigger a motion alarm any time the screen changes, whether there is a video or simply a screen saver. The screen can be masked out as described in **Section 4.2**. You can also reduce the level of motion sensitivity in specific areas of the screen by following the instructions in **Section 8.3**.

Fans/Machinery. Motion is motion and if machinery within the camera's field of view starts automatically, it will cause an alert. Similarly, if the camera is mounted on a wall with machinery on the other side that causes it to vibrate, that can also cause it to detect motion. Moving machinery within the camera's field of view may be masked off as mentioned above, or motion detection may be turned off for that channel. If there is another camera that covers access to the area where the machinery is located, you can set it so that the first camera will only be recording when triggered by a motion event detected by this second camera. See "**Triggers**" in described in **Section 8.3**.

Bugs. An occasional insect flying through the field of view is usually not enough to trigger an alert. However, some flying insects are attracted to infrared light and will swarm the camera. This is usually a temporary situation that occurs at only a certain time of the year. Lighting the area with yellow "bug light" of sufficient brightness can keep the camera operating in daylight mode and keep the infrared LEDs turned off. A second solution is to set the channel to record all the time, and turn motion detection off at night until "bug season" is over. Reducing the motion sensitivity (**Section 3.4**) can also reduce alerts as can using another camera to trigger recording as described above.

Additionally, keep your cameras clear of spider webs as the movement of the webs due to wind or critters in the web will cause an alert. The reflection of the infrared off the webs and back into the camera will also reduce the night vision range.

Snow/Rain. As with bugs, this is usually a seaonal event and may require motion detection to be temporarily disabled to avoid false alarms. However, positioning the camera further under shelter, such as closer to the wall and away from the edge of the eaves, can make the rain or snow too small for the camera to notice. Adjusting motion sensitivity may also help in some situations.

BASIC OPERATION CHAPTER 3

This chapter is intended to get your system operational in a baseline format now that you've connected your system and turned it on after following the instructions on the Quick Start Poster that came with your system. This chapter combines information and instructions on several submenus and settings but may not mention all of the functions or options available in a given menu. For many users, these basic operating instructions may be all they need to operate their security system. But, because this system offers many more features, the next chapters will cover additional and more advanced operations in greater detail.

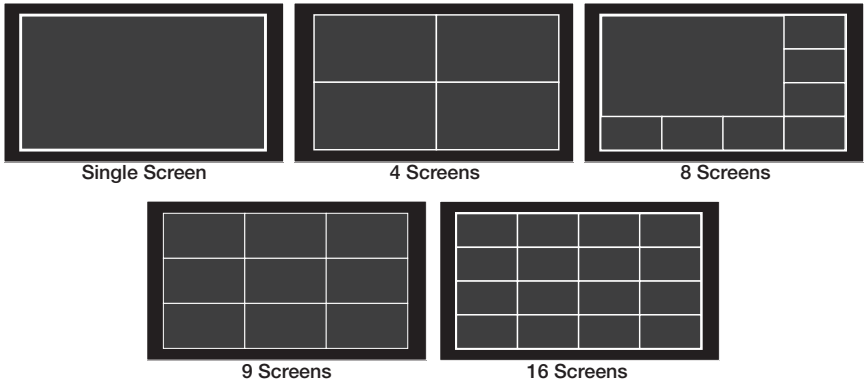
3.1 OPERATION

This DVR can be controlled through the USB mouse, the remote control or by using the buttons on the front of the device. For the purposes of this manual, instructions will be given for using the mouse.

In operation, the mouse functions in the same manner as one would use a mouse attached to a computer; point, click, right-click, and etcetera. In fields where data needs to be entered, clicking on the field will bring up a virtual keyboard. (**See Section 2.3 Mouse Control**)

3.2 LIVE VIEW

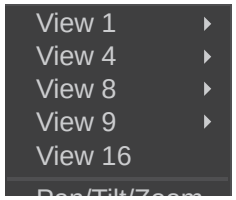
Live View is the default mode for the DVR. It will display the video feeds from up to four, eight or 16 cameras depending on model. You do not need to be logged into the DVR to view or change the channel(s) on the screen. The actual number of channels displayed depends on the number of cameras you own. You can view a single channel in full-screen mode or multiple channels simultaneously in a variety of layouts.



PICTURE 3-1

Clicking on any one screen in multi-view mode will bring that screen to full-screen single-view mode. The exception is in eight-view where clicking on one of the smaller displays will move it to the larger display.

In addition to selecting the viewing mode from the **Shortcut Menu** using the mouse, you can also cycle through the modes using the up and down arrows on the remote or the front of the DVR. The left and right arrows on both the remote and DVR front panel will cycle through which channels are displayed.



PICTURE 3-2

In **Live View**, along with the channel(s), you will see the system date and time displayed along with the name and icons indicating the status of each channel. Setting the system date and time and changing the channel names is covered in **Section 4.3** under the **Settings** menu.

NAVIGATION BAR

Left-clicking on the screen in Live View mode will open the Navigation Bar allowing you shortcut access to select menus and functions. It also serves as an easy-to-view status bar showing the current situation with alerts, network, and drives.

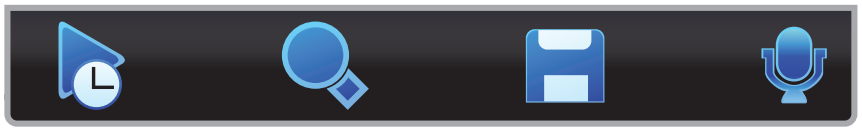
PICTURE 3-3

	Opens Main Menu		Minimize/ Maximize Bar		Screen Display Mode		PTZ Controls
	Opens Search Menu		Alarm Status		Network Status/ Opens Network Window		Manage Hard Drive
	Startup Wizard		Opens Tour Setup Window				

The icons on the navigation bar will also alert you to issues with the status of your drive, network connection and alarms with red icons when a situation arises.

SHORTCUT VIDEO CONTROLS

When the mouse cursor is in the top-center portion of a channel with a live video stream, a set of shortcut controls will appear. These allow you to perform quick playback and backup functions, digitally zoom in and add another camera.



PICTURE 3-4

	Realtime Playback		Digital Zoom
	Quick Backup		Two-Way Talk (certain models only)

Clicking the **Realtime Playback** icon will cause the window to play back the most recent video clip recorded by that camera. The duration of this clip is set in the **General Settings** menu.

Click the **Digital Zoom** icon and then select an area of interest within that channel's video feed to enlarge the area. Right-click with the mouse to exit the zoom.

Quick Backup allows you to save the current live video to a USB drive inserted into the front USB port. If no drive is present, you will receive an error message.

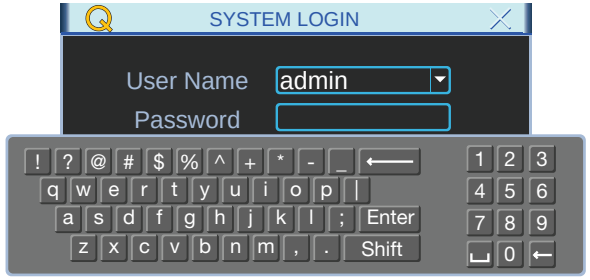
If you have a speaker and microphone located near your camera and you have a microphone located at your DVR, clicking on the **Two-Way Talk** icon will allow you to talk anyone within the same area as the camera. The icon will be green while this feature is active. Unclick it to hear any responses. You can set the number of pictures taken with each click in the **General Settings** menu (see **Section 4.3**).

You can close the controls either by either right-clicking or by moving the mouse out of the area.

3.3 LOGIN, LOGOUT AND MAIN MENU

LOGIN

When the DVR starts up, the default video display is multiple window mode. Right-clicking the mouse or pressing the **Enter** button on the front of the DVR will bring up the **Shortcut Menu** (covered on the next page) allowing you to select an action, however before you can access certain functions, the **System Login** screen will open to allow you to log in.



PICTURE 3-5

Using the mouse or remote control, select your user name and enter your password. Whenever the cursor is over a text field, a keyboard icon will appear to the right. Clicking within the field itself will open the virtual keyboard as explained in **Section 2.2**. Clicking on the keyboard icon allows you to cycle between numbers, letters (upper and lower case) and symbols when appropriate.

Until new accounts are added, there are two pre-configured accounts available to users who log into the NVR:

- Administrator (local and network) User name: ***admin*** Password ***admin***
- User name ***user*** Password ***user***

You must have access rights – whether as the system administrator or logged-in user – in order to change settings. See **Account** in **Section 4.4** for information regarding user accounts.

IMPORTANT! It is highly recommended that you change your system password after you log on for the first time to ensure the security of your system. Record your changes and keep that information stored securely as the system will prevent access if the incorrect login information is attempted three times within a 30-minute period. If you find yourself locked out of the DVR because of this, wait 30 minutes, reboot the DVR and attempt to log into it again.

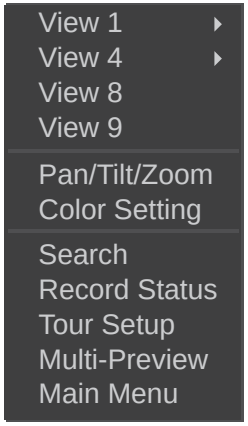
Once you have logged in, the DVR will display one or more camera channels in Live View. How many channels are displayed will depend on how many cameras you have connected as well as what multi-view mode you have chosen.

After a period of inactivity – configurable in the **General Setting** submenu described in **Section 4.3** – the DVR will log users out. This will require the current user to re-enter their password.

SHORTCUT MENU

In **Live View** mode, right-clicking anywhere on the screen will bring up the **Shortcut Menu**.

This menu allows you to quickly change your viewing mode as well as moving directly to a selection of menus, including the **Main Menu**. The options available in this menu will differ based on your DVR model. A four-channel system will not offer an eight-channel viewing option, for instance.



PICTURE 3-6

View This allows you to select the number of cameras appearing on-screen at one time. Options (when available) allow you to select which channel(s) you wish to view.

Pan/Tilt/Zoom If your DVR has a PTZ camera connection, selecting this option will open up the PTZ control panel to allow you to take control of the camera or select a Tour, Cruise or other setting that has been created in the **PTZ Settings** window. Please see **Section 5.2** for instructions on setting up a PTZ camera.

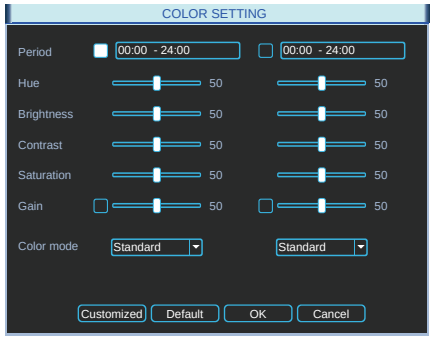
Search This opens the **Search and Playback** window. See **Section 3.5** for details.

Record Status This window will show you the current status of all cameras. You can override your settings by turning some or all of the cameras on or off. Cameras can also be set to detect motion.

Tour Setup Use this to have your **Live View** cycle through selected camera channels.

Multi-Preview Enable this to allow a split screen display when accessing the DVR remotely using the **Web Service** application. See **Chapter 3** of the **Remote Monitoring Guide** for more information.

Color Setting This will open a new window allowing you to adjust how the cameras appear on screen. This will not affect the recorded video at all. You can adjust Hue, Brightness, Contrast and etc., choose from pre-configured options or customize your own. Additionally, you can also schedule the cameras to switch between two modes at different times of day.

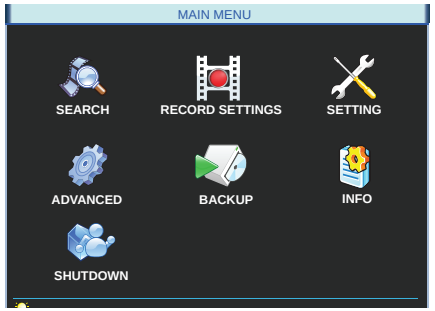


PICTURE 3-7

MAIN MENU

After logging in, you can view – and access - the DVR's functions through the Main Menu.

There are seven submenus available; **Search**, **Record Settings**, **Setting**, **Advanced**, **Backup**, **Info** and **Shutdown**. Clicking on an icon will take you to that function or the submenu it represents.



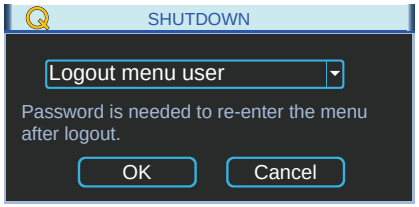
PICTURE 3-8

SHUTDOWN

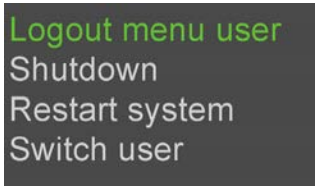
Selecting the Shutdown icon in the Main Menu will open the Shut Down window.

This window allows you to choose to log out as a user, shut down the system, restart the system or switch users.

In addition, the DVR can also be shut down by pressing on the front panel power button for three seconds. The system will stop operating and it can then be turned off via the **Power** button on the rear of the DVR.



PICTURE 3-9



PICTURE 3-10

AUTO RESUME

In the event of a power failure, the DVR will automatically save any video files it is currently recording and will then resume scheduled operations once power is restored.

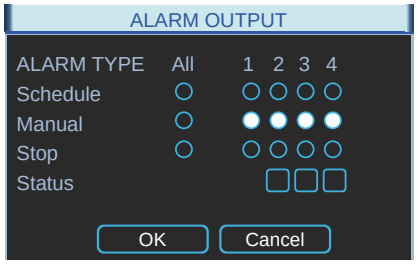
3.4 RECORDING

Your DVR is factory set to record when motion is detected. Most users prefer this as it means that it is easier to locate an event using the **Search** function (see **Section 3.5**) and it will take longer before the DVR will need to overwrite older files on the hard drive. You can override this in the **Record** menu, as discussed below, or you can schedule the hours when the NVR captures motion.

MANUAL RECORDING

This window allows you to override the scheduled recording times of selected cameras. You can access the **Record Menu** via the **Shortcut menu** or by pushing the **Record** button on the remote.

There are three status modes: **Schedule**, **Manual** and **Stop**. The status of each channel is shown by the filled circle under its number. Each camera can only have one status at a time. Changes take effect once the **OK** button is selected.



PICTURE 3-11

Manual – The selected cameras will begin recording

Schedule – Cameras record based on your settings made in the **Schedule Menu** or **Detect Menus** (**See Sections 3.6 and 3.7** respectively)

Stop – All selected cameras stop recording

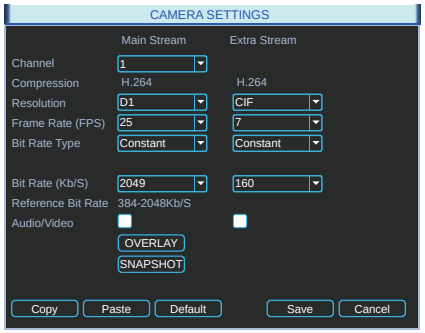
You can assign the same values to all cameras by selecting the desired status in the "**All**" column.

CAMERA SETTINGS

This window allows you to manage the quality of the recording from each channel as well as the transmission rate and whether there's an accompanying audio feed.

As with other windows described earlier, each channel can be set individually or all at the same time. Settings can be copied from one channel and pasted to another. Only by hitting **Save** will your settings be retained. Right-clicking or hitting **Cancel** will leave the system with your previous settings.

The system is configured to record using the H.264 format and this cannot be changed.



PICTURE 3-12

In addition to the settings for display on the DVR, you can also adjust the settings for the sub-stream display, referred to as **Extra Stream 1** in this window. This stream is the data that is sent to remote monitoring devices. Due to bandwidth concerns, these data streams are generally smaller than those sent directly to the DVR itself. These streams run in parallel with the main stream sent to the hard drive and they do not affect each other.

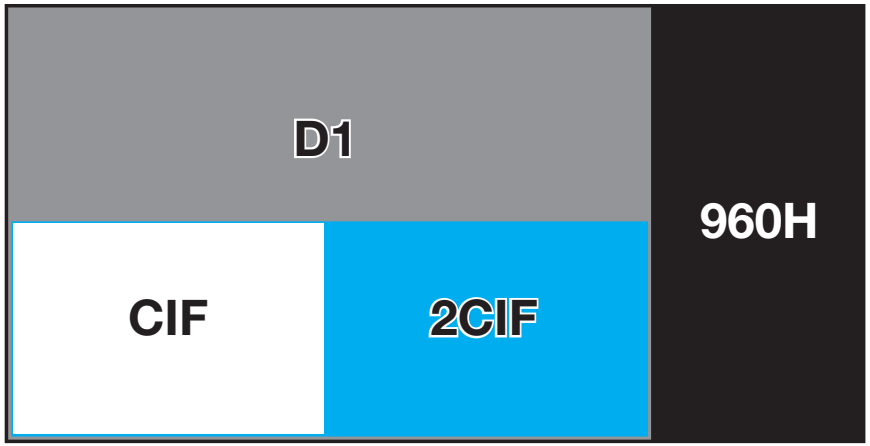
Resolution – Depending on your model, your system will support recording and playback of video at four different resolutions:

CIF: 352x240 pixels 2CIF (also known as HD1): 720x240 pixels

D1: 720x480 pixels 960H: 960x480 pixels

A comparison is shown below (at 33% actual size). Each resolution encompasses the area of the smaller resolutions in addition to the area labeled.

The larger resolutions will require more storage space on a hard drive than the smaller formats. On some systems, there is also a trade-off during recording or playback where the larger formats will need to be played back or recorded at a reduced frame rate than the smaller ones. This is especially true when multiple videos are being played back at the same time.



PICTURE 3-13

The Extra Stream can only use the CIF resolution.

The **Specifications** pages in the back of this manual contain information about your DVR's recording resolution capabilities.

Frame Rate (FPS) – Variable between 1 to 30 frames per second. The higher the number, the smoother the playback.

Bit Rate Type – Variable versus Constant. Variable provides better compression, but issues may arise when streaming for remote viewing.

Bit Rate (KB/S) –Configurable from 192 to 1024 kilobytes per second, this is the maximum bit rate the selected channel can utilize. Your network may not have enough bandwidth to handle maximum rates from all of your cameras. Adjusting these settings to suit your network will improve performance and on-screen image quality.

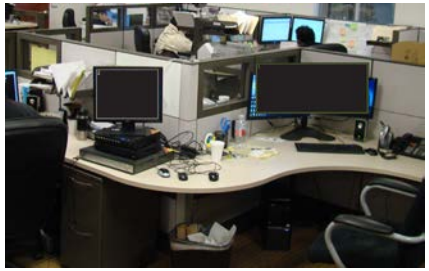
Audio/Video – Selecting this box adds an audio feed (if you have a microphone located at or near the camera). On the **Extra Stream**, you can enable the **Audio** (first box in that column) only if the **Video** box is also toggled.

Overlay – This window allows you to mask off areas from view. This is useful in circumstances such as when a camera's field of view includes a combination lock or other similar situation.

You can mask up to four areas in each camera's field of view in two modes. Preview mode blocks the area for both local and network viewers. Monitor allows the local user to view the area but remote viewers cannot see the area. These privacy blocks affect both the live view and playback. You can select either or both allowing you to block selected areas for one set of viewers but not others.

PICTURE 3-14

Clicking any of the numbered boxes will create a black area in the upper left corner of the screen. If you select more than one, they will all be located in the same place. Clicking on the **Set** button will hide the **Overlay** window and give you a view of that camera's video feed along with the black box(es). The active box will be outlined in green and you can switch between boxes by clicking on another one. Each box will have its number inside. It can be moved and sized as needed using the mouse. Right-clicking on the screen will return you to the **Overlay** window.



PICTURE 3-15

Time Display – This allows you to display the system time on the channel's screen during playback or not. In addition, by clicking the **Set** button, the time display can be relocated anywhere on the screen by clicking and dragging. A "Before" and "After" example is shown in **Picture 3-16**.

PICTURE 3-16

Channel Display – Like time display, this toggles the appearance of the channel's number on the screen during playback as well as allowing it to be repositioned in a similar fashion.

SNAPSHOT

In addition to taking video of an event, the DVR can be set to record - and transmit - still images from whichever cameras you select in the **Schedule** and **Detect** windows which are covered in **Sections 3.6** and **4.7** respectively.

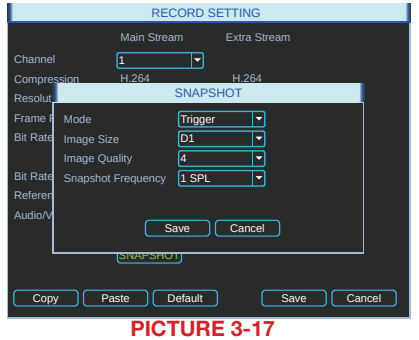
The actual settings for the Snapshot feature are configured in the **Snapshot** window which can be opened by pressing the **Snapshot** button in the **Record Setting** window.

Mode - The only option available is Trigger

Image Size - **D1** produces an image twice the size of **CIF** . You can chose to use a different format for snapshots than the format that camera is configured to record video.

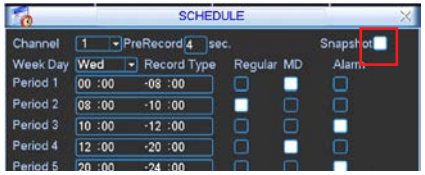
Image Quality - With a range of 1 to 6, this controls the quality of the snapshot(s). A setting of "4" provides better images, but at an increased file size. You may have to lower the quality if the file size exceeds your e-mail in-box's capacity.

Snapshot Frequency - This will allow you to take 1-7 shots in sequence.

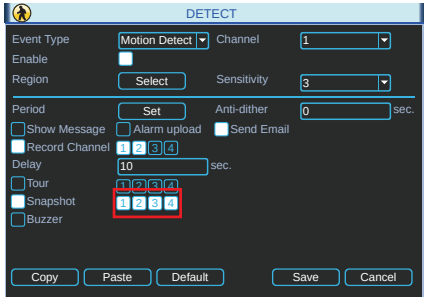


PICTURE 3-17

Each camera can be individually configured. These settings are what will be used when you enable the **Snapshot** feature in any window that offers that option. Examples are highlighted with Red Boxes in **Pictures 3-18** and **3-19**.



PICTURE 3-18



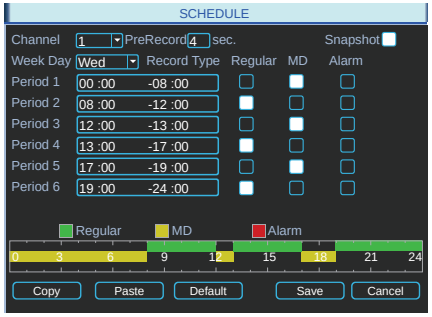
PICTURE 3-19

NOTE! It is possible to have the Snapshot feature set to occur both on schedule and when triggered by an event such as Motion Detection. The triggered activation will take priority over the scheduled event.

SCHEDULE

The **Schedule** menu is located in the **Settings** menu and it allows you to determine when your cameras will record and under what circumstances. While the settings in this menu can be generally overridden by the user in the **Record** menu, the settings made in the **Schedule** menu are more detailed and flexible.

NOTE! The menu will show the option to record based on Alarm notification. This feature is not available on this model and cameras set to record using this setting will not be activated.


SCHEDULE
Channel 1 PreRecord 4 sec. Snapshot
Week Day Wed Record Type Regular MD Alarm
Period 1 00 :00 -08 :00
Period 2 08 :00 -12 :00
Period 3 12 :00 -13 :00
Period 4 13 :00 -17 :00
Period 5 17 :00 -19 :00
Period 6 19 :00 -24 :00
Regular MD Alarm
0 3 6 9 12 15 18 21 24
Copy Paste Default Save Cancel

PICTURE 3-20

Channel – The first setting is which channel you wish to configure. In addition to selecting a channel number, you can globally configure all of your cameras by selecting the **All** option.

Week Day – You can set the recording schedule by day of the week, or apply the schedule to every day.

Pre-Record – This allows you to capture the moments before an event occurs. You can set the lead time from 1 to 30 seconds depending on the bit stream you are recording at.

Snapshot – By selecting this feature, you enable the DVR to take a still image "snapshot" when an alarm occurs. The number of snapshots taken, their format and other parameters are set in the **Encode** menu. (See **Section 4.3** for details.)

Record Types – You can schedule which type of recording occurs at what time of the day. There are six blocks of time that can be scheduled, and the duration of those blocks can be determined as well. There are two types of recordings that can be made; **Regular** (always recording) and **MD** (motion detection) as well.

A white-filled box underneath a **Record** type indicates that it has been selected for that block of time. If no boxes are selected, that camera will not record although you will be able to see its video feed in **Live View**.

You may set more than one type of recording to occur at the same time but it should be noted that when regular recording is selected, the DVR will be already be recording whether a Motion Detection event occurs or not.

NOTE! Motion Detection can also be set up in the Detection menu as described in **Section 3.7**. If you need the DVR to do more than just record Motion events, then follow the instructions in **Section 3.7**. You do not need to set up motion detection in both menus.

Default – Returns your DVR's recording settings to the factory default of recording all the time.

You must check the **Save** button to apply your settings. Right-clicking or hitting **Cancel** will leave your settings unchanged.

MOTION, VIDEO LOSS AND CAMERA MASKING DETECTION

The **Event** menu is a submenu of the **Setting** menu and contains the Motion Detection settings in addition to those for Video Loss and Camera Masking. Each channel can be individually configured to respond to each event as you chose, or you can give all cameras identical settings.

The upper portion of this window is for setting the type of event, whether it is activated, and specific parameters relating to event detection. The bottom portion of this window allows you to choose how the system will respond to these events.

Motion Detection

With the **Event Type** drop-down set to Motion Detect, you can configure your DVR to record when someone or something moves through a camera's field of view. Please note that this is an alternate way to schedule motion detection to the method laid out under **Schedule** but it offers further refinements including what actions the DVR will take when motion is detected. You do not need to set up Motion Detection in both sections but the DVR will use the schedules from both menus to determine when to record Motion events.

EVENTS
Event Type Motion Detect Channel 1
Enable
Region Select Sensitivity 3
Trigger Period Set Hold Time 0 sec.
Record Continue 0 sec.
Alarm Out 1 2 3 Alarm Continue 10 sec.
Show Message Alarm upload Send Email
Record Channel 1 2 3 4 5 6 7 8
PTZ Activation Select
Tour 1 2 3 4 5 6 7 8
Snapshot 1 2 3 4 5 6 7 8
Copy Paste Default Save Cancel

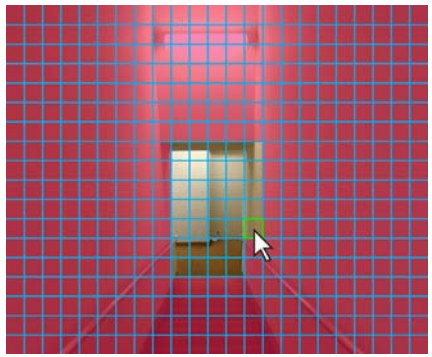
PICTURE 3-21

Channel – You can select an individual channel to configure or select **All** to give all of your cameras the same settings. You must have set that channel to record motion detection in the **Schedule** menu as described in the previous section.

Region – Clicking the **Region** button will bring up a grid overlaying that camera's view.

By default, each "block" of the grid will have a red hue indicating that it is sensitive to motion detection. Clicking in a block will make it clear meaning that motion detection has been turned off for that area. Turning off motion detection in selected areas is useful for situations when there is frequent movement by inanimate objects such as flags or wind-blown trees and this will reduce false alerts. You can click and drag the mouse to turn off multiple blocks at the same time and you can deactivate motion detection in multiple, separate, areas of the screen.

To reactivate motion detection, simply repeat the process in the deactivated blocks and they will regain their red hue and detect motion as normal.



PICTURE 3-22

You cannot use Copy/Paste in **Motion Detection** because each channel will have a different display. Right-clicking will exit the screen and your settings will be saved.

Sensitivity – The system supports six levels of sensitivity with Level 6 being the most sensitive.

VIDEO LOSS

By default, this is enabled. In the event that the DVR detects a loss of signal from a camera, it will send out a notification or activate other functions based on your settings in the lower portion of the **Event** window.

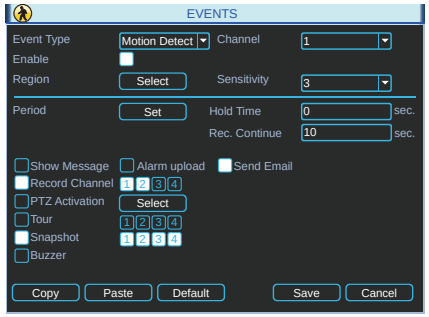
CAMERA MASKING

This is also enabled by default. If the system detects that something has covered a camera, it will respond based on your settings in the lower portion of the window.

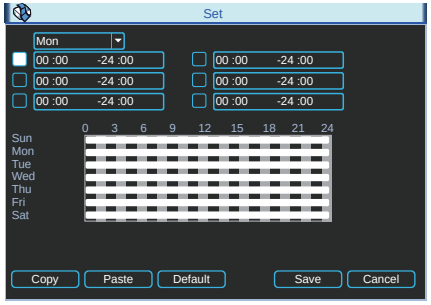
EVENT RESPONSE

The lower portion of the **Event** window determines what actions the DVR will initiate upon detection of one of the three event types. Responses to a specific type of event can be individually tailored to each camera, but the response to different types of events must be set independently of each other. (ie: The response settings for a motion detection event do not change the settings for a video loss event – even if you've set identical responses.)

Trigger Period - This is where you set the schedule of when you want the DVR to record motion events. It operates in the same manner as the Schedule menu as described in **Section 3.6** with six blocks of time that can be laid out for recording to occur during a day. Not all blocks have to be configured or enabled. You can configure each day individually, or you can make separate schedules for week days and weekends.

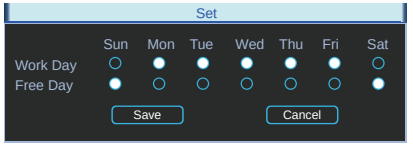


PICTURE 3-23



PICTURE 3-24

The **Set** button will appear when either **Work Day** or **Free Day** is selected in the drop-down. This allows you to arrange the schedule to reflect your business' weekly schedule.



PICTURE 3-25

The **Copy** and **Paste** buttons allow you to duplicate a day's settings on another day while the **Default** button returns the DVR to recording Motion Detection events 24/7.

Once you have made your settings, select **OK** to save them and you will be returned to the **Event** menu. Hitting **Cancel** or right-clicking to exit the menu will not save your changes.

Hold Time – This is the length of time that the DVR will watch for another motion event before treating a second event as a separate alarm. The delay can be from 0 to 600 seconds (10 minutes).

Record Continue – The DVR will continue to record for a period after the event has ended. This can be set to last up to 5 minutes.

Show Message – When this is enabled, the system will bring up the **Alarm Status** window whenever an event is detected. You can configure this to display when motion, video loss or masking is detected.

Alarm Upload – Your DVR can upload an alert message to the FTP server. Please see **Advanced Network Setup** in **Section 1.2 of the Remote Monitoring Guide** for instructions on setting up the DVR to work with an FTP server.

Send E-mail – E-mail notifications can be sent a single e-mail address. Please see **Advanced Network Setup** in **Section 1.2 of the Remote Monitoring Guide** for instructions on how to set up the e-mail alerts including recipient address.

Record Channel – When one camera detects an event, you can set the DVR to activate recording on other cameras.

PTZ Activation – When selected, this will cause a connected Pan-Tilt-Zoom camera to perform a pre-set action. This would be the first action programmed for the camera in the PTZ menu. Please see **Chapter 5** for instructions on setting up a PTZ camera.

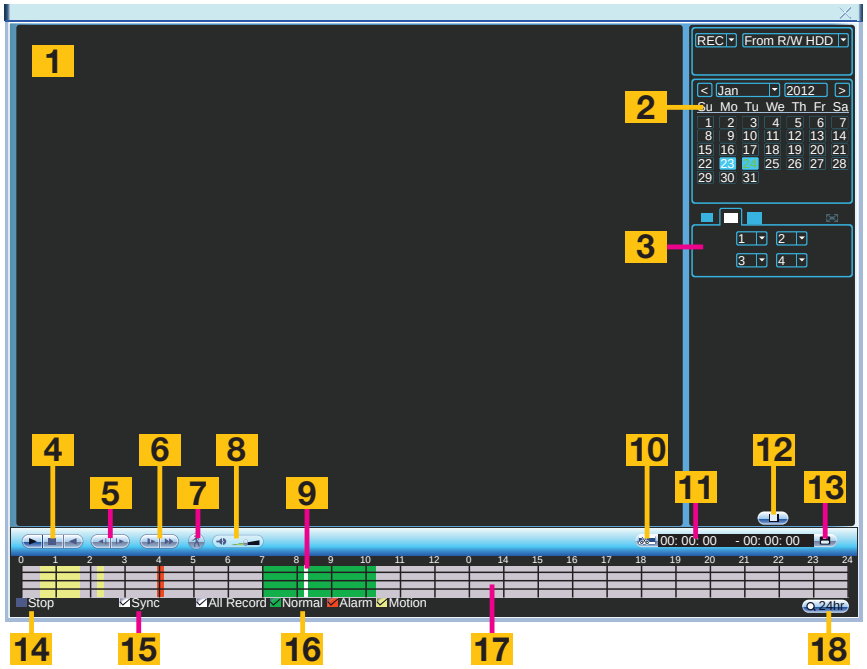
Tour – This will cause the DVR to cycle through selected channels on the display in live view.

Snapshot – The DVR is capable of taking still images which can be sent via e-mail or FTP (See **Advanced Network Setup** in **Section 1.2 of the Remote Monitoring Guide** for full instructions.)

Buzzer – When selected, the DVR's internal alarm will sound when an event occurs.

3.5 SEARCH AND PLAYBACK

The **Search and Playback** window can be accessed through the **Shortcut menu**. You can view the playback from any camera that was activated during the recording session. You are also able to view the playback from multiple cameras simultaneously.



PICTURE 3-26

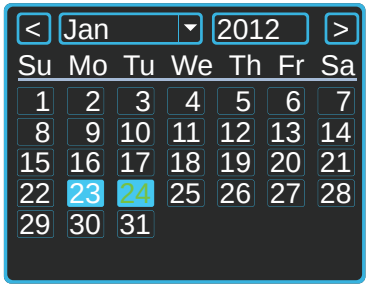
#	Item	Function
1	Playback Window	Displays the video from one or more channels
2	Calendar	Shows dates that contain recordings
3	Screen Display Mode	Select the number of screens to display simultaneously. You can also select which screens are played back.
4	Play/Pause	Play video forwards or backwards.
5	Frame Advance	Each click advances or reverses the playback by one second.
6	Slow/Fast Play	Speed up or slow down playback. Four speeds each.
7	Jump to Motion	Click to jump to the point where motion was first detected.
8	Volume	Adjust playback volume. Requires a microphone equipped camera or microphone collocated with a camera and connected to the DVR.
9	Playback Indicator	Shows the progress of the video playback.
10	Create Video Clip	Set the start and end points within a video to create a shorter video clip.
11	Time Indicator	Shows the start and end points of the video clip.
12	File List Search	This allows you to search for a video occurring around a specific time.
13	Backup	Save the video clip to a removable USB flash drive or external USB hard drive.
14	Status Indicator	Indicates video playback status - playing, paused, etc.
15	Sync	When unchecked, allows simultaneous playback of different channels starting at different points in time.
16	Record Modes	Allows selection of which type of video recordings to search.
17	Video Indicator and Progress Bar	Shows the time period(s) that video was recorded, along with the recording mode of that video.
18	Time Scale	Adjust the scale of the Video Indicator and Progress Bar from 24 hours down to 30 minutes.

SEARCH

There are two ways to search for an event - by recording block and by starting time in the **Event List**:

Recording Block Search

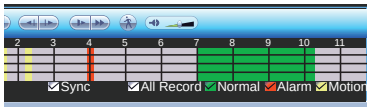
STEP 1. The calendar in the upper right of the **Video Search** window will show dates containing recorded video in blue.



PICTURE 3-27

STEP 2. Color-coded blocks indicating recorded video will appear in the **Video Indicator and Progress** bar.

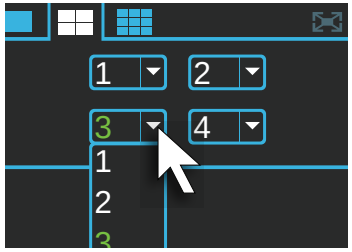
STEP 3. Click on a recording block to begin playing back from that time, or you can click on the **Start** button to commence playback from the first video recorded that day.



PICTURE 3-28

STEP 4. If needed, you can further refine the search to specific channels by choosing a single- or multiple-channel display format and then selecting the desired channels to view simultaneously using the pull down menu.

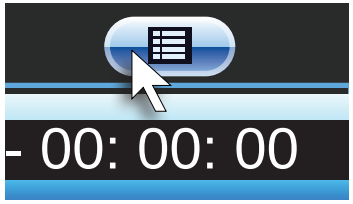
Additionally, you can check or uncheck the colored boxes below the **Video Indicator and Progress** bar to choose which types of record (Motion Detection, Alarm, etc.) you're interested in.



PICTURE 3-29

STEP 5. Once you have refined your search parameters, click on the **Search** button to refresh your results.

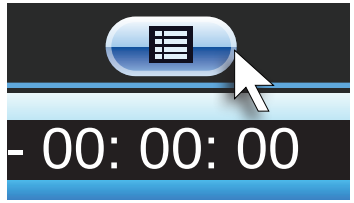
You can then start your video playback as described in **Step 3**, above.



PICTURE 3-30

Event List Search

This search format allows you to easily find a specific event and play it back on a single channel. You should select the single-channel display mode for viewing.



PICTURE 3-31

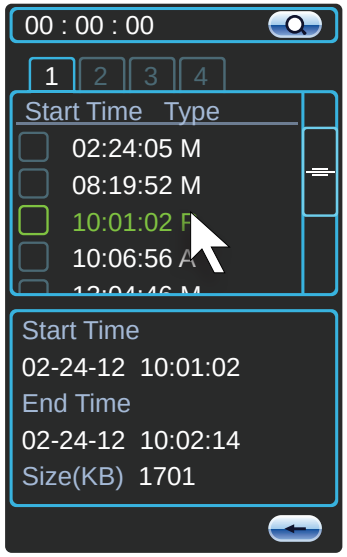
STEP 1. As with Recording Block Search, use the calendar in the upper right of the of the **Video Search** window to locate dates with video records.

STEP 2. Click the **Event List** button to bring up a list of recorded events. They will be listed in order of starting time and will have a one-letter code after the time to indicate the event type:

R = Regular recording

A = External alarm triggered recording

M = Motion detection recording



PICTURE 3-32

STEP 3. Each channel will have a tab showing when video events were recorded by that camera. You can start playback of an event by double-clicking on it. The Playback Indicator (a vertical white bar) will appear in the Video Indicator and Progress bar at the corresponding point. You can adjust the playback using the controls as normal (see **Playback** on the following page).

The **File Information** window below the file list shows details about that particular clip.

STEP 4. You can refine your search by entering a more exact time above the list and then clicking the **Search** button (magnifying glass). This will refresh the list and eliminate events occurring before that time.

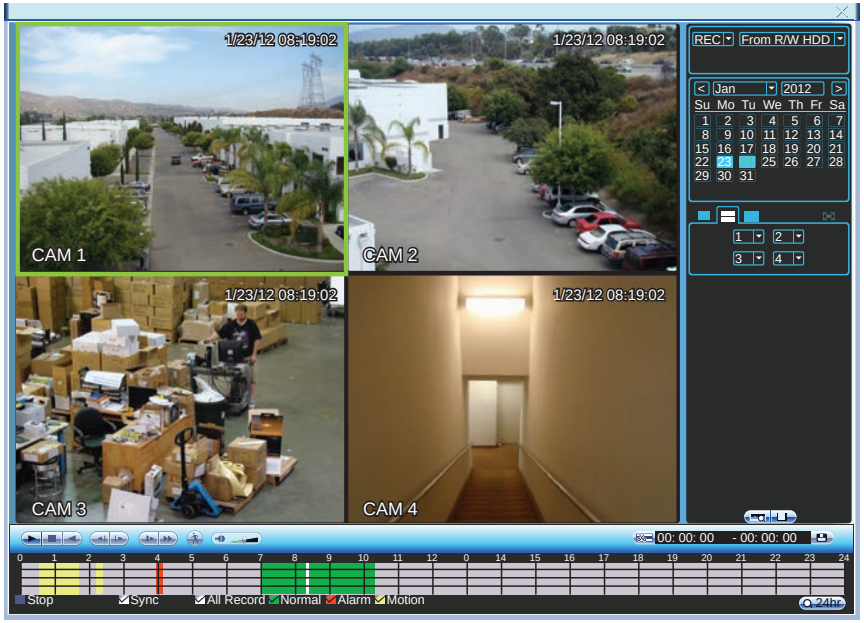
Using the playback controls will close the **Event List**, but you can return to it without losing the search results. You may also exit the **Event List** by clicking on the arrow below the **File Information** window.

PLAYBACK

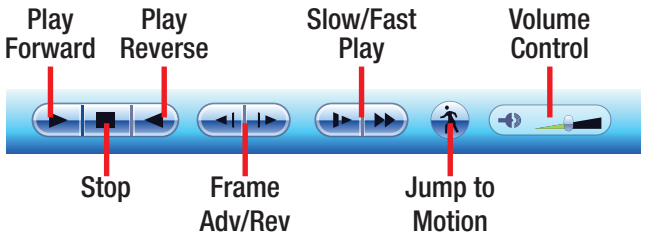
Once you've selected your video(s), you can control the playback in the same manner as using a VCR or computer's media playback software. The playback interface includes features that add an extra level of control, including the ability to play in reverse as well as forward, frame-by-frame movement and multiple playback speeds. Certain buttons will be grayed out depending on the playback mode.

Double-clicking on a screen in a multi-channel display format will switch to a single-channel display. Double-clicking again will enlarge it to full screen mode, hiding the Search area on the right and the **Video Indicator and Progress** bar below, although the latter will pop up if the mouse is moved to the bottom of the screen. Double-clicking a third time will revert back to the multi-channel display mode that you had selected. Right-clicking when in single screen or full-screen mode will reverse the process. Right-clicking while in your original viewing mode will end the video playback.

In most circumstances, the control buttons affect the video on all screens in a multi-channel display. Unchecking the **Sync** box at the bottom of the screen will allow independent control of each channel. In this case, the controls will only affect the screen highlighted in green. Click once on a camera's view to select that channel. It should also be noted that certain functions only work - or work best - in single-channel viewing mode.



PICTURE 3-33



PICTURE 3-34

Start, Stop and Play

Clicking either of the **Play** buttons will start the playback in the desired direction. The button's icon will change to a **Pause** icon to allow you to freeze the playback as needed. If you have **Sync** unchecked, clicking **Stop** will end the playback of the video in the selected screen while any other videos will continue to play. Otherwise, **Stop** will end the video playback on all screens.

Frame Advance/Reverse

These buttons are only active when the playback has been paused. They allow you to move forward or backward in 2-second increments.

Slow/Fast Play

There are four speed settings for each button. Clicking these buttons will increasingly slow or speed up the playback as appropriate. When the after the fourth setting is reached, a subsequent click will return the playback to normal speed. You can also decrease the effect of one button on speed by clicking the other. Example: With playback set on "Fast 3", you can slow it down to "Fast 2" by clicking on the **Slow Play** button.

Jump to Motion

Depending on your video recording settings made in the **Event** window (see the next section), your DVR may pre-record for an extended period time before the event actually appears in the file. Clicking on the **Jump to Motion** button will take you to the second before the motion happens. This will only occur on the highlighted screen. The other displays will not be shown.

Volume

If you have a microphone-equipped camera or a microphone collocated with your camera you can play back any audio that was recorded along with the video. Adjust the volume with the slider as needed.

DIGITAL ZOOM

Digital zoom in video playback operates differently than it does in Live View as described at the beginning of this chapter. Both are digital zooms where the image is electronically enlarged - usually in exchange for a decrease in image clarity. You can digitally enlarge an area of a video by clicking and dragging with the cursor on the area of interest. This action will draw a green rectangle on the screen. When you release the mouse button, the cursor will change to a magnifying glass.

Click within the border to zoom into the area. If you need to re-draw the box, merely click outside the area to dismiss the box and then re-select the area.

In the case of a multi-screen viewing mode, the zoomed-in view will fill only that portion of the screen occupied by that channel. You can switch to single-screen mode by double-clicking on the screen as described earlier. You can also go to full-screen mode and back to multi-screen mode as well. Right-clicking with the mouse will return you to the full channel view.

PICTURE 3-35

VIDEO CLIP

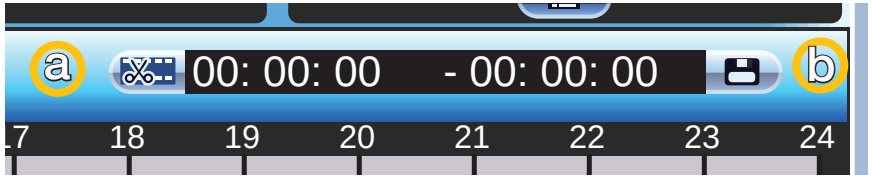
This allows you to save only a portion of a video clip. For example; if you have a camera set to record all the time and it captures some action in a five-minute segment, you can clip only that portion and back it up. In addition to making an incident readily available, saving only the portion of interest will reduce the amount of disk space needed to back it up.

STEP 1. Select a file to view in the normal manner.

STEP 2. Find the section of interest and press the **Clip** button (a)

STEP 3. Drag the playback bar to the end of the section, or allow the video playback to progress to the desired endpoint and press the **Clip** button again.

STEP 4. Press the **Backup** button (b) to save the file to a USB drive connected to the USB back-up port on the front of the DVR. It is not possible to save the edited clip to the DVR's hard drive.



PICTURE 3-36

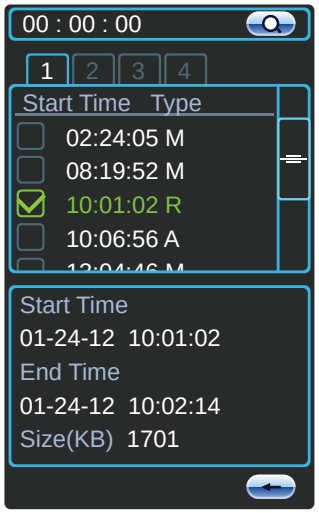
BACK-UP

This process is different than the backup procedure described in **Section 3.8 Backup** at the end of this chapter where one can back up saved files located across multiple days. Instead, this procedure allows you to quickly save files or clips that you have located without having to search for them again. Once you have backed up these files to an external USB device they can be played back on a computer.

You must have a USB device connected to the USB port on the front of the DVR before proceeding.

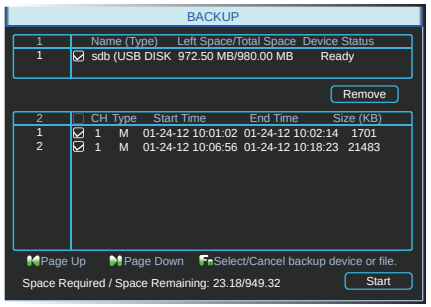
STEP 1. In your file list to the right of the playback screen, check the box next to the file(s) you wish to save.

STEP 2. Click on the **Backup** button (**item b in Picture 3-36**) and the **Backup** window will open.



PICTURE 3-37

STEP 3. Your device will be listed at the top of the window showing how much space is available. Below it, the list of file(s) you wish to back up will be displayed along with type, start and end times and size. At the bottom of the window, the space required to save the file(s) will be displayed. You may uncheck any files you do not wish to back up at this time. The Remove button will remove all the files from your list.


BACKUP
Name (Type) Left Space/Total Space Device Status
sdb (USB DISK 972.50 MB/980.00 MB Ready
Remove
CH Type Start Time End Time Size (KB)
1 M 01-24-12 10:01:02 01-24-12 10:02:14 1701
1 M 01-24-12 10:06:56 01-24-12 10:18:23 21483
Page Up
Page Down
Select/Cancel backup device or file.
Space Required / Space Remaining: 23.18/949.32
Start

PICTURE 3-38

STEP 4. Press **Start** to back up your selected files.

Right-clicking the mouse will exit this window without saving the files.

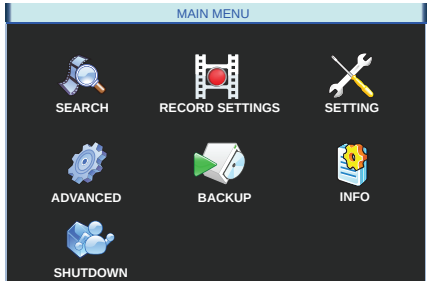
NOTE! The video files are in a proprietary format that will not play outside the DVR without being converted to .avi format using the included General Player software included on the Manuals and Software disc that came with this DVR or available for free download at Q-See.com by searching for your model number and looking under Software.

Right-clicking with the mouse will exit the playback window.

3.6 BACKUP

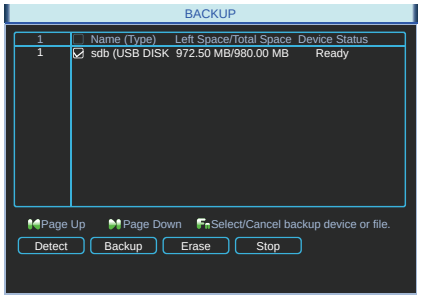
This DVR supports backing up files from the hard drive to both an external USB storage device as well as over a network. Network downloads are covered in the **Remote Monitoring Guide**. The USB port on the front of the device is the only port usable for backing up files.

The **Backup** menu can be reached through the Main menu.



PICTURE 3-39

The **Backup** window will display any connected devices along with available space and status. If you have a device connected to the USB port on the front of the DVR and it does not appear, press the **Detect** button. If it still does not appear, then use a different USB device.

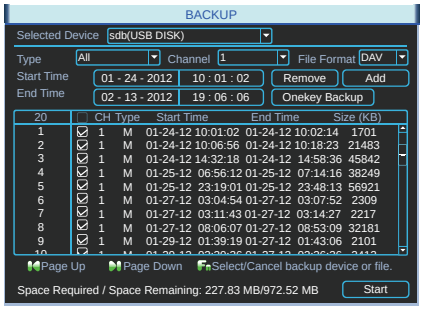


PICTURE 3-40

NOTE! External USB hard drives used for backing up data will need to be in the FAT32 format. Most new drives will need to be reformatted before use with this DVR. Formatting instructions are provided at the end of this chapter.

Once an external USB device is detected, pressing the **Backup** button will open a new window allowing you to select which files to back up. You can select by channel, start and end times, as well as which type of event; regular recording, alarm, motion detection or all of them.

Only files with a check mark in front of them will be backed up. You can deselect whichever files you choose or select them all by selecting the box at the top of the list.

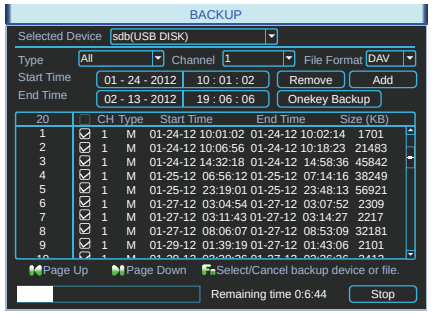


PICTURE 3-41

If you need to clear space on your external drive, you can use the **Erase** button. This will delete **ALL** files on that device.

Once you have selected the files, press **Start** to begin the download. A progress bar will be displayed showing estimated time remaining. During the download, the **Start** button will change to **Stop**. You can stop the process at any time by pressing the button again.

You can also right-click out of the menu once the file transfer has begun to go on to other activities without cancelling the download.



PICTURE 3-42

The files will be saved with the following naming format:

SN_CH(channel number)_TYPE_TIME(Year, Month, Date, Hour, Minute, Second)

Therefore, a file shown on the DVR as being a regular record (R), being recorded on 01/04/11 starting at 2:00:00 would have a file name of:

1_01_R_010411020000.dav

The Year Date Month format is the same as you have set in the **General** interface. The files can be played back using the software included on the CD accompanying this DVR.

FORMATTING A USB DRIVE IN FAT32

To format a USB flash drive with FAT32, plug it into a PC running Windows XP or later. Go to **My Computer** to locate the drive's icon. Right click on it and select **Format** in the list of available options. Select **FAT32** and check the box marked **Quick Format** before clicking **Start**.

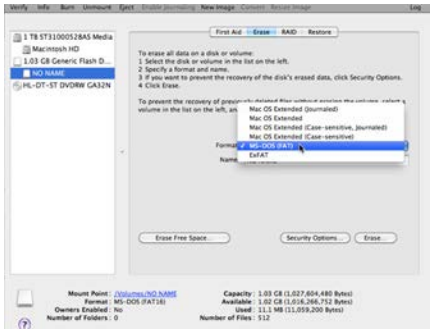
For USB drives over 32GB in size, you should use a FAT32 format utility such as those available through ***CNET.com***.

On a Macintosh computer, you will need to reformat the USB flash drive using the Disk Utility app located in the Utilities folder within the Applications folder. Connect your drive to a USB port on the Mac and it should appear in the list on the left of the window.

Select your drive from the list, making sure that it is highlighted before proceeding.

In OSX 10.6, you can set the format to MS-DOS (FAT) in the **Erase** tab. In OSX 10.7, you will use the **Partition** tab.

Click the **Apply** or **Erase** button, depending on your system, to reformat the USB drive



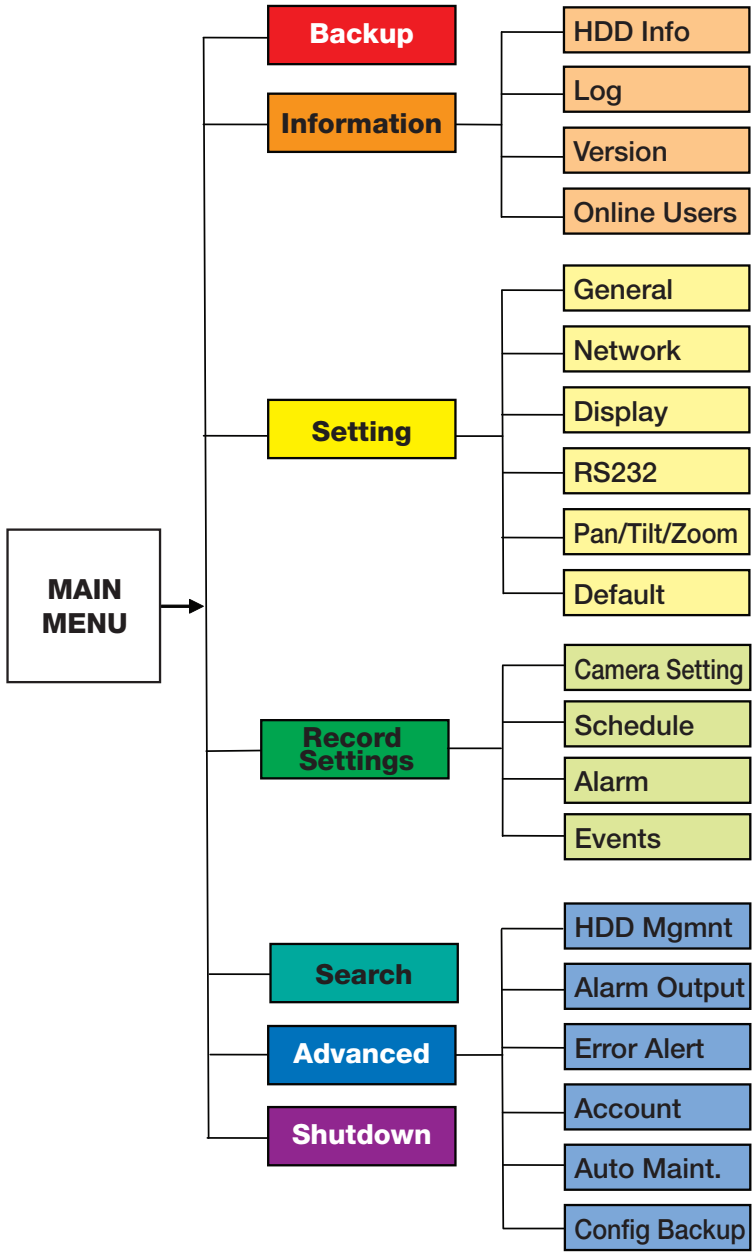
PICTURE 3-43

IMPORTANT! Reformatting a drive will erase ALL data on the drive!

MENUS

CHAPTER 4

Once you're ready to move beyond basic operation, the other menus in the system will allow you to configure the DVR to your individual needs.



4.1 MAIN MENU

The **Main Menu** can be accessed at any time from the Live View by right-clicking the mouse and bringing up the **Short Cut Menu**. Pressing the **Return** button on the side of the DVR will also bring up the **Main Menu**.

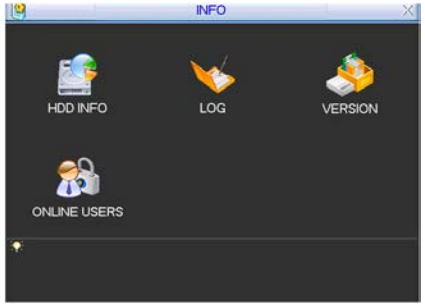
There are six submenus available; **Search**, **Info**, **Setting**, **Advanced**, **Backup** and **Shutdown**. Clicking on an icon will take you to that function or the submenu it represents.

The **Search** menu is covered in **Section 3.5 Search and Playback**.

PICTURE 4-1

4.2 INFO MENU

Double-clicking on the **Info** icon will open the Info window. There are five items: **HDD** (Hard Disk Drive) **Info**, **Log**, **Version** and **Online Users**.



PICTURE 4-2

HDD INFORMATION

This window displays information on the type, size, available space and status of the system's internal hard drive.

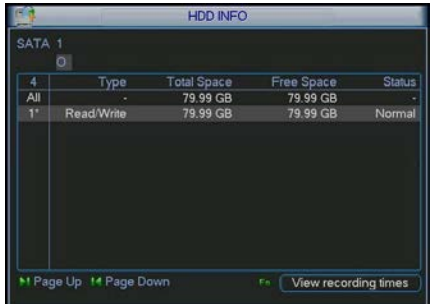
The system supports a single SATA hard drive and it will be designated SATA 1. Below the drive name is the drive status indicator.

"O" Drive is operating normally.

"X" Indicates an error

"-" Hard drive not installed

"?"Hard drive is damaged



PICTURE 4-3

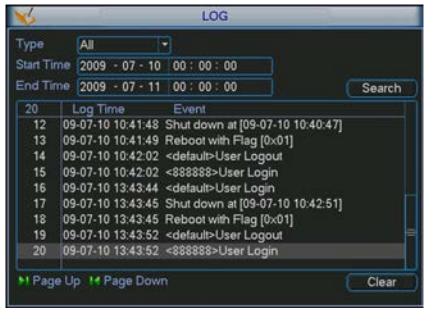
In the case of a hard drive error, the system will come directly to this menu. An error may be indicated if the hard drive time and system time do not match. To resolve this issue, adjust the time in the **General setting** menu located in the Setting menu (See **Section 4.3**) and restart the system. Formatting the drive, using **HDD Manage** as described in **Section 4.4 Advanced** is another possible solution to drive errors.

If the drive is damaged or missing, you will need to install a drive. Please see **Chapter 6** for hard drive installation instructions.

Select **View Recording Times** to show files recorded on the DVR.

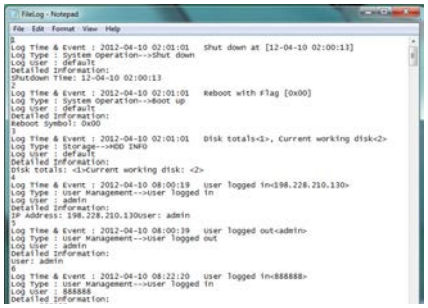
LOG

Any activity on the DVR is logged and recorded on the system. This information can be viewed and searched from this window.



PICTURE 4-4

Information on user access, system shutdowns, changes in recording status, video loss and etcetera are listed. You can search for activity in a similar manner to the file search. This information can be backed up to an external USB drive in the same manner as video files and it will be saved as a text document that can be opened by a word processor, NotePad or other text reader application.

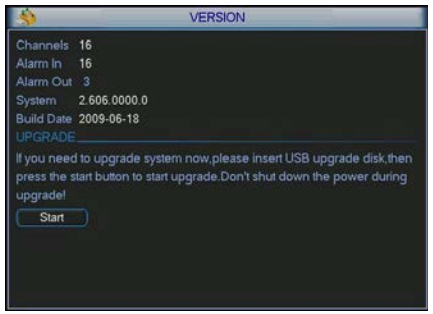


PICTURE 4-5

VERSION

This display shows system hardware and firmware specifications.

The hardware data shows the number of channels the system is configured for along with the number of alarms in and out that can be utilized. The system's serial number is also displayed, along with the version and build date of the firmware.


VERSION
Channels 16
Alarm In 16
Alarm Out 3
System 2.606.0000.0
Build Date 2009-06-18
UPGRADE
If you need to upgrade system now,please insert USB upgrade disk,then press the start button to start upgrade.Don't shut down the power during upgrade!
Start

PICTURE 4-6

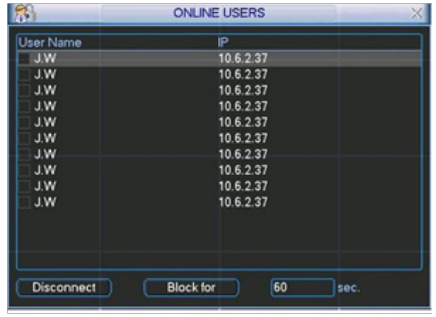
You can update the firmware using this menu. Check your product's page at ***www.Q-See.com/Support*** to see if you have or need the latest version of the firmware. If your system is operating without problems, we recommend that you do not update the firmware unless there is an added feature that you need. To update the firmware, you must download the file from our website and save it onto a removable USB drive that is otherwise empty. Connect the USB drive to the port on the front of the DVR and press **Start**.

ONLINE USERS

A list of users accessing the DVR from over the network or through the Internet is shown in this menu.

The user's name as well as the IP address used to access the DVR is displayed.

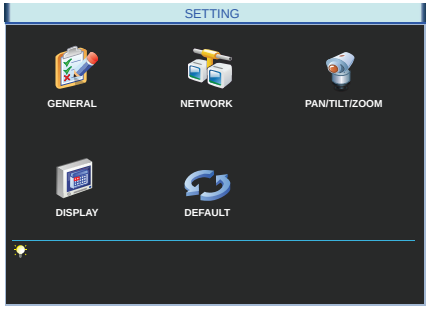
If you have proper system management rights (Configured in **Account**, See **Section 4.4 Advanced** for full instructions), you can disconnect or block a user. The maximum time a user can be disconnected is 18 hours (65,535 seconds).



PICTURE 4-7

4.3 SETTING MENU

Double-clicking on the Setting icon will open the Setting menu window. This menu contains a number of the settings that are not related to recording video, but rather affect how the DVR operates in general. Additional settings are available in the **Advanced** menu covered in **Section 4.4**. The available selections will vary by the model of DVR, but can include: **General**, **Network**, **Pant/Tilt/Zoom**, **RS232**, **Display** and **Default**.

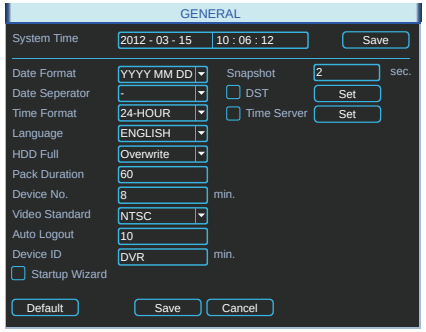


PICTURE 4-8

GENERAL

This window is where the basic settings for the DVR are configured. Your settings will only be saved if you click the Save button before exiting the window.

IMPORTANT! You **MUST** stop all recording before changing the date or time.



PICTURE 4-9

System Time – The date and time

Date Format – Choose from Year-Month-Day, Month-Day-Year or Day-Month-Year

Date Separator – The three options are a dot (.), dash (-) or slash (/)

Time Format – Chose between 24-hour (military-style) or 12-hour (AM/PM) formats

Language – The system currently supports English, Spanish or French. The system will need to be restarted for the language change to take effect.

HDD Full – Depending on the number of cameras recording, the size of your hard drive, how many cameras are recording and how often, image quality and other factors, your DVR's hard drive can be completely full of recordings in one to four weeks. When it is full, the DVR will stop recording unless you set it to overwrite older files.

IMPORTANT! The overwrite features should be enabled before you begin recording or the DVR may not delete files created before that point. If this occurs, reformatting the hard drive will fix the situation.

WARNING! Overwritten files can not be recovered. Important files should be backed up onto another device to prevent loss.

Pack Duration – Rather than creating 24-hour long files when a channel is set to record all the time, this allows you to set the maximum record length between one to two hours (measured in minutes).

Device No. – If you are controlling more than one DVR with a single remote, this allows you to give each DVR a separate numerical ID.

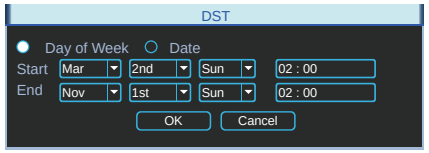
Video Standard – By default, this DVR operates using the NTSC standard common to North America. Video output can be switched to PAL for areas where that is used.

Auto Logout – This sets the duration of inactivity before the DVR will automatically log a user out of the system.

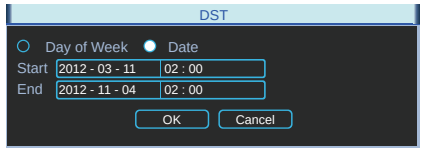
Device ID – If you are monitoring more than one DVR remotely, giving each an identifying name will assist in keeping track of which system is being monitored.

Snapshot – When you enable snapshots in the Schedule menu (see **Section 4.6**), this determines how much time will pass between snapshots. You can set the interval from 1 to 600 seconds (10 minutes).

DST – In order for your DVR to adjust to Daylight Savings Time automatically, you should enable the function and then set whether DST begins and ends in your region based on a variable date such as the last Saturday of a particular month or a specific date.

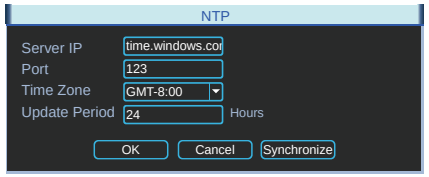


PICTURE 4-10



PICTURE 4-11

Time Server – Enabling this allows a DVR that is connected to the Internet to automatically maintain accurate time - including adjustments due to Daylight Savings Time - in the same way that a computer does.



PICTURE 4-12

Server IP - The default server used to obtain accurate time is the Windows server, but you can manually enter in another.

Port - This is the port that the DVR will use to contact the server.

Time Zone - You will need to set your time zone. For North America these are:

Eastern Time Zone = GMT-5	Central Time Zone = GMT-6
Mountain Time Zone = GMT-7	Pacific Time Zone = GMT-8
Alaskan Time Zone = GMT-9	Hawaii Time Zone = GMT-10

Update Period - This is the frequency at which the DVR will check the time with the server.

Synchronize - Clicking this will cause the DVR to update the time immediately.

NETWORK

Accessing the DVR from within a Local Area Network, over the Internet or via a Smartphone along with setting up e-mail notifications and other online features will be covered in full in the **Remote Monitoring Guide** included on the CD that came with your DVR or available for download from ***www.Q-See.com.***

PTZ

Please see **Chapter 5** for instructions on connecting and operating a PTZ camera.

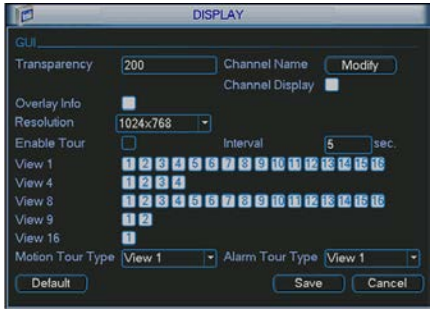
EVENT

Please see **Section 3.7** for instructions on using the features in this window.

DISPLAY

This window contains the settings that control the Graphical User Interface (GUI) as well as how you view the DVR.

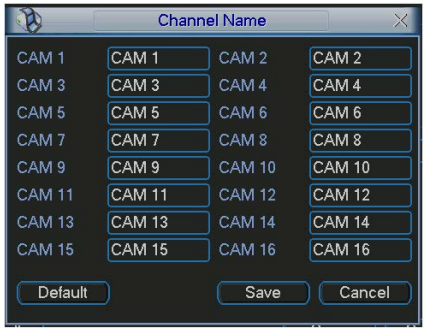
Transparency – You can choose to make the menu screens more transparent or opaque with 128 being the most transparent and 255 being completely opaque.



PICTURE 4-13

Channel Name – You can name each channel - up to 25 characters. An example is naming the channels based on where they're located.

Time Display and **Channel Display** – These buttons enable their respective displays on the video during playback.



PICTURE 4-14

Resolution – There are five pre-set options; 1366x768 (default), 1280x1024, 1280x720, 1024x768 and 800x600. The DVR will need to reboot in order for these changes to take place.

Enable Tour – Selecting this box will cause the screen to cycle through displaying channels selected in the following fields.

Interval – This is the time – from 5 to 120 seconds – that the DVR will display each group of channels before moving to the next group in the tour.

View – These are the number of groups available in each tour. Deselecting a number means that this group of channels will be skipped during the tour.

Motion Tour Type – If a motion detection event occurs, and the Tour button is selected in the Detect window (**See Section 3.7**) the DVR will switch a single-screen view tour or an eight-screen view tour displaying the channels that were selected in that menu.

In Tour mode, you will see an icon in the upper right corner of the display which allows you to control the tour by right-clicking upon it. Clicking upon the icon will cause the tour to start or resume.

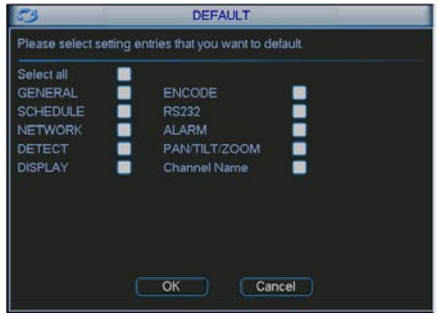
	Window switching mode enabled
	Window switching mode stopped

PICTURE 4-15

DEFAULT

The options in this window will allow you to return various settings back to their default configuration.

The settings that will be changed are self-explanatory.

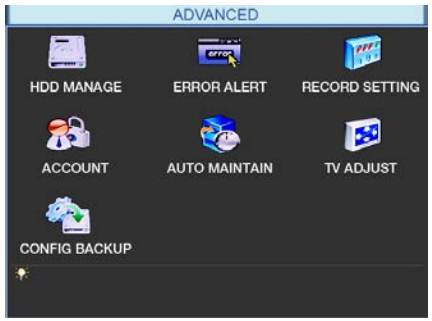


PICTURE 4-16

WARNING! Language, time display mode, video format, IP address, and user account will not retain your settings after being reset back to default values!

4.4 ADVANCED

The settings in this menu cover user accounts, hard disk management, video display, and system maintenance.



PICTURE 4-17

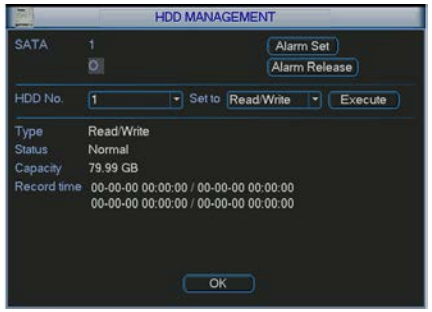
HDD MANAGE

This displays some of the same information found in the **HDD Info** window in the **Info** menu (see **Section 4.2**) but this window allows you to make additional settings.

The drive name and status is displayed.

The status indicators are:

O	Drive is operating normally.
X	Indicates an error
-	Hard drive not installed
?	Hard drive is damaged



PICTURE 4-18

Clicking on **Alarm Set** opens the **Abnormality** window which is covered immediately following this section.

Alarm Release – this turns off any disk alarm that may be occurring.

You can set the hard drive to four states:

Read/Write	Normal operation. The device records (writes) files to disk and plays (reads) them.
Read Only	No more files can be recorded onto the drive, but existing files can be viewed.
Format	Reformats the hard drive.
Recover	If you are having problems with the hard drive, including corrupted files, selecting Recover causes the drive to re-set, but does not erase its contents.

CAUTION! Reformatting the hard drive will erase all recorded events.

No changes will take place unless the Execute button is pressed once you've made your selection. The drive's status will be displayed next to the Type heading below the pull-downs. If you make changes and press **Execute**, the DVR will restart once you press **OK** to exit. You cannot right-click out of the menu.

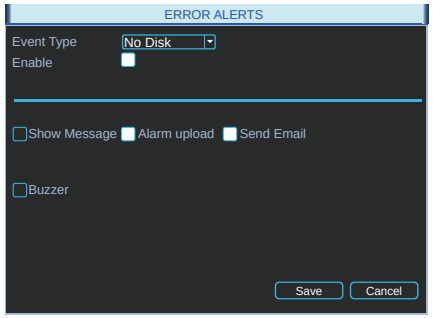
ERROR ALERTS

This window allows you to set up alarms for disk and system disconnection errors as well as how these alarms are handled. Each type of alarm can be independently enabled along with what events that type of alarm will trigger.

Event type – Chose from No Disk, Disk Error, Disk No Space, Net Disconnected and IP Conflict.

Show Message – When enabled, this will display the event notification on the DVR's screen.

Alarm Upload – This feature is not available on this model.



PICTURE 4-19

Send E-mail – this will send an e-mail notification to the recipient address set up in the **Network** menu (see **Section 1.2 Advanced Network Setup** in the **Remote Monitoring Guide**).

RECORD SETTING

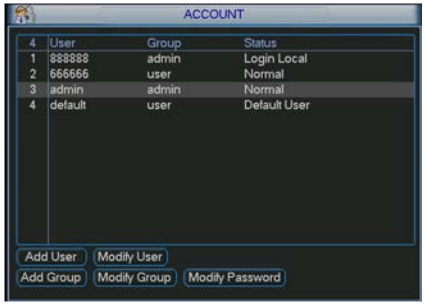
This is the **Manual Recording** window covered in **Section 3.4**.

ACCOUNT

This is the account management window which allows you to add or delete users, create user groups, modify the access privileges of users, and create or change passwords.

There are two pre-configured default users; Admin, and 666666. Only Admin has administrator rights.

When adding a user, you not only create their user name and password, but you can grant or deny control over specific activities on the DVR, including which cameras that user can view or play back. These privileges can be changed later by an administrator-level user using the **Modify User** button. Administrator Users have control over 60 different functions while basic Users have 35 functions that can be allowed or denied.



PICTURE 4-20

A user or group name can consist of at most eight characters and no two users may have the same user name. There is no limit to the number of users or groups.

The **Memo** field allows you to include a note about the user or group that is only visible in this window.

Toggling the **Reusable** box allows more than one user to log in using this account

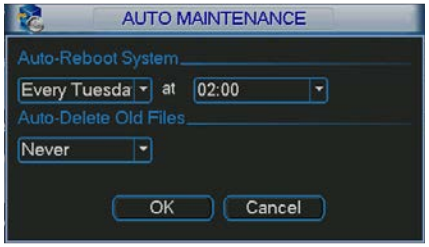
Creating a group gives you the ability to set the access privileges for as many users and any users' rights cannot exceed that of the group they are in.

Selecting **Modify Password** opens a new window which allows you to select the user whose password you want to change. Enter the old password and then the new password twice.

AUTO MAINTENANCE

Much like a regular computer, this DVR benefits from being restarted after extended periods of operation.

You can determine when the system will automatically reboot and you can optionally have it auto-delete old files at that time as well. You can set this option to delete files that are 1-31 days old.



PICTURE 4-21

TV ADJUST

This control is for use if you have an external TV monitor connected to the Video Out. It allows you to adjust the picture on the television to allow the display to fit the margins of that screen.

PICTURE 4-22

4.5 BACKUP

This window was covered in **Section 3.8 Backup**

4.6 SHUTDOWN

This is the preferred method to use when shutting down the DVR.

When this window is opened, you have the option of logging out as a user, switching the user, shutting down the system or restarting it.

MAIN MENU
SHUTDOWN
Logout menu user
Logout menu user
Shutdown
Restart system
Switch user
Logout the OSD menu or reset/restart the system. After idle for standby time (no inputs), the system will exit OSD automatically.

PICTURE 4-23

PAN/TILT/ZOOM CAMERAS

CHAPTER 5

5.1 CONNECTING A PTZ CAMERA

The RS485 connector is used to connect and control PTZ cameras. It uses a single-direction protocol meaning that it can send commands out to the camera(s) but not receive any data back from the unit.

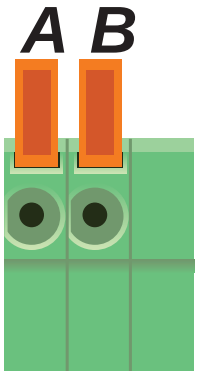
The DVR is set by default for RS485 to be disabled for each channel. Therefore, PTZ settings must be enabled before PTZ cameras can be utilized. This system supports 26 of the most common protocols including Pelco-D and Pelco-P.

When connecting a PTZ camera, the following should be taken into account:

- Shielded twisted wire is recommended with the shielded layer being used to connect to the ground. Improper grounding may result in chip damage. We recommend using CAT 5 or CAT 6 wire for this purpose.
- The 485 port of this DVR cannot parallel connect with the 485 port of another device
- The voltage between the A and B lines of the camera should be less than 5V.

STEP 1. The two wires of the data cable from the PTZ camera must be inserted into the ports labeled A & B as shown in **Picture 6-1**. Multiple PTZ cameras can be connected to this port, but you may require an expander port to do so.

STEP 2. The color of these leads will vary by manufacturer but they should be labeled "**+**" or positive and "**-**" or negative. The positive wire should be inserted into port A with the negative going into port B.



PICTURE 5-1

The insulation on both leads should be stripped to expose about 1/8" or 4mm of bare metal. You must push in the orange tab above the port with a small item like the end of a paperclip while inserting the wire lead. When the wire is sufficiently inserted, release the orange tab. Pull gently on the wire to ensure that it is locked in the port.

STEP 3. Connect the other end of the cable to the proper pins in the connector on the camera

STEP 4. Connect the camera video and power cables as you would any other camera.

5.2 PTZ CONTROL AND SETUP

The following instructions are based on the Pelco-D protocol. You will need to have the manual for your PTZ camera at hand to ensure the proper settings within the DVR.

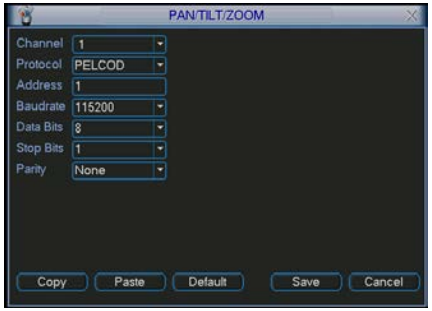
SETUP

For ease of set-up, the PTZ camera's video feed should be displayed on the screen.

STEP 1. Open the **Pan/Tilt/Zoom Menu** from the **Settings** menu. You cannot use the **Shortcut Menu** to access the PTZ controls until after you have configured a channel to use PTZ.

PICTURE 5-2

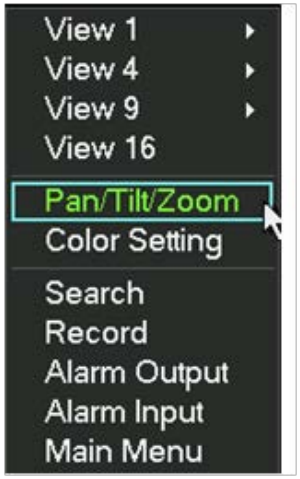
STEP 2. Be certain that the channel listed at the top is the one which the PTZ camera will be connected to. Enter data into the other fields according to the data provided in your PTZ camera's manual, including protocol, data bits, stop bits and parity.



PICTURE 5-3

STEP 3. Click the save button once you have entered the settings. If you are operating an identical PTZ camera on another channel, you may use the **Copy** and **Paste** buttons to apply those settings to the channel that camera is connected to. Be sure to check that the camera's address did not change as well.

STEP 4. Once you have saved your settings and exited the menu, you can right-click the mouse to bring up the **Shortcut Menu** allowing you to select the Pan/Tilt/Zoom controls.



PICTURE 5-4

CONTROL

Selecting the Pan/Tilt/Zoom shortcut will open the **Pan/Tilt/Zoom** controls window

Speed – From 1 to 8

and adjust zoom, focus and iris

PICTURE 5-5

Using the mouse, you can control the direction of the camera's movements by clicking on the arrows.

PICTURE 5-6

Intelligent Positioning Key - If your protocol supports it, clicking and dragging in the blue button in the center will allow you to move the camera faster – between 4 to 16x speed.

SETTING PRESET/PATROL/PATTERN/SCAN

Clicking the Set button in the **PTZ Control Panel** (**Picture 5-5**) opens a new window in addition to leaving the **PTZ Control Panel active**.

This window allows you to set up the PTZ's Preset, Tour, Pattern and Border functions.

PICTURE 5-7

Preset

STEP 1. Start by using the eight direction arrows on the PTZ Control Panel (Picture 6-5) to position the camera where you want.

STEP 2. Click the Preset button in the Function list and enter the number you want to assign to this preset.

This preset can now be added to a tour.

Patrol

STEP 1. Click the Patrol button in the Function list and enter the number of the preset you wish to add to it.

STEP 2. Click Add Preset to enter it into the tour. You can have up to 80 presets in a single patrol.

STEP 3. Assign the patrol a number

PICTURE 5-8

Pattern

STEP 1. Click the Pattern button in the Function list.

STEP 2. Click the Begin button

STEP 3. Modify the zoom focus and iris settings using the **PTZ Control Panel** (**Picture 5-5**)

STEP 4. Click the End button to save the changes

STEP 5. Enter the desired number for this pattern into the field.

PICTURE 5-9

Border (Auto Scan)

STEP 1. Click the **Border** button in the Function list

STEP 2. Select either the **Left** or **Right** button to indicate which edge you are defining

STEP 3. Use the direction arrows in the **PTZ Control Panel** (**Picture 5-5**) to move the camera to the limit desired.

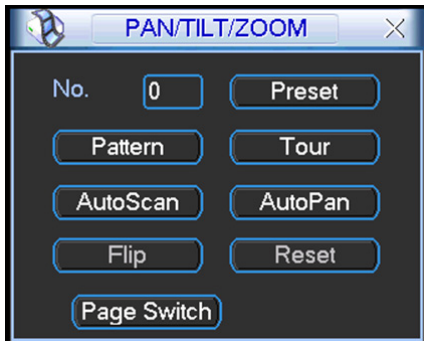
STEP 4. Repeat for the other border.

PICTURE 5-10

In the **PTZ Control Panel** (**Picture 5-5**), clicking the PTZ Trace button will begin the auto scan. The button will convert to a Stop button which can be used to end the scan.

RUNNING PTZ FUNCTIONS

Clicking on the **Page Switch** button in the **PTZ Control Panel** (**Picture 5-5**) will switch to a new window (**Picture 5-11**) which allows you to activate the functions created above as well as the Auto Pan and Flip functions.



PICTURE 5-11

Enter the number of the function you wish to activate and select the function button to run that function.

In addition, there are other functions that can be engaged in this window.

AutoPan - This will cause the camera to automatically rotate.

Flip - Most PTZ cameras have a mechanical stop which will prevent the camera from rotating a full 360°. If the camera is tracking someone or some thing and it reaches this stop, pressing Flip will bring the camera around the other direction to continue tracking. Some PTZ cameras have "E-flip" which will do this automatically.

Page Switch - returns you to the **PTZ Control Panel** (**Picture 5-5**)

Reset - This ends the currently running function.

ALARMS

CHAPTER 6

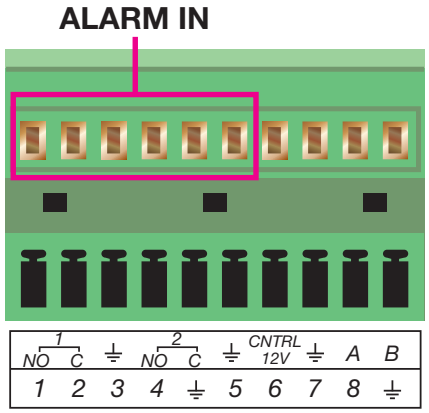
This DVR features connections for external alarms – both input and output. When an event is detected the system can notify local users or send notification to a monitoring service. At the same time, the system can accept signals from motion detectors, smoke detectors or other alarms and begin recording based on that input and your settings.

You will need to have the manual for your alarm(s) handy to ensure the proper settings within the DVR.

6.1 ALARM INPUT

When attaching alarms, the following criteria must be met:

1. The alarm input must be grounded.
2. A grounding signal is required for the alarm input
3. When connecting the DVR to another device - including another DVR - through the alarm input, a relay should be used to separate them.

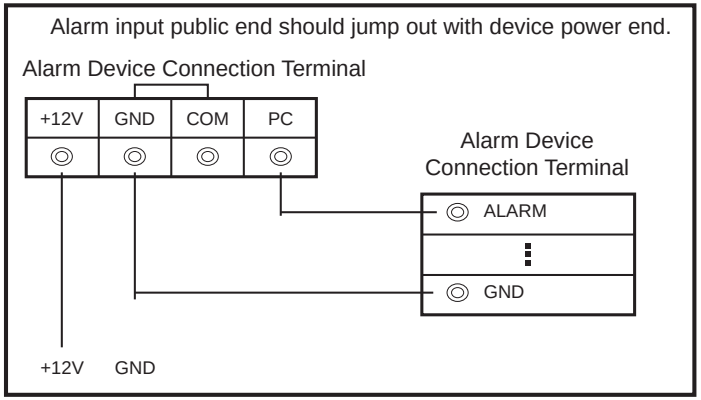


PICTURE 6-1

Parameter	Grounding Alarm
⏚	Ground line
Alarm Input	1, 2, …, 8 becomes valid in low voltage.
1-NO C 2-NO C	Two NO activation outputs.
CTRL 12V	Controls the power output You need to close the device power to cancel the alarm.

The accompanying diagram (**Picture 6-2**), along with your alarm's manual should be consulted to ensure proper connection.

- Normal open or Normal close type
- Parallel connect COM end and GND end of the alarm detector (Provide external power to the alarm detector).
- Parallel connect the Ground of the combo DVR and the ground of the alarm detector.
- Connect the NC port of the alarm sensor to the combo DVR alarm input(ALARM)
- Use the same ground with that of combo DVR if you use external power to the alarm device.



PICTURE 6-2

6.2 ALARM OUTPUT

The alarm output port should not be directly connected to a higher power load (greater than 1A) to avoid high current which may damage the relay. Use the co-contactor to establish the connection between the alarm output port and the load.

- 2 way relay alarm output (NO contact). Provides external power to external alarm device.
- To avoid overloading, please read the following relay parameters sheet carefully.
- RS485 A/B cable is for the A/B cable of the PTZ camera.

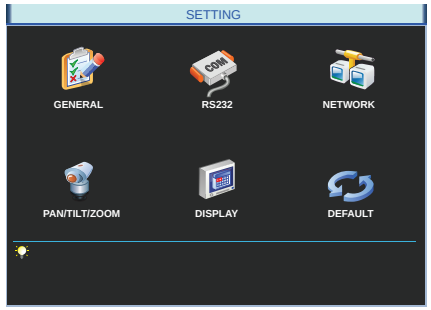
Relay Specification

Model:	JRC-27F	
Material of the contact	Silver	
Rating (Resistance Load)	Rated switch capacity	30VDC 2A, 125VAC 1A
	Maximum switch power	125VA 160W
	Maximum switch voltage	250VAC, 220VDC
	Maximum switch currency	1A
Insulation	Between contacts with same polarity	1000VAC 1minute
	Between contacts with different polarity	1000VAC 1minute
	Between contacts and winding	1000VAC 1minute
Surge voltage	Between contacts with same polarity	1500V (10×160us)
Length of open time	3ms max	
Length of close time	3ms max	
Longevity	Mechanical	50×106 times (3Hz)
	Electrical	200×103 times (0.5Hz)
Temperature	-40°C ~+70°C (-40°F to +158°F)	

6.3 ALARM SETUP AND ACTIVATION

Once external alarms are properly connected, you can configure the DVR to activate them.

The **Alarm** interface can be selected from the **Setting** menu.



PICTURE 6-3

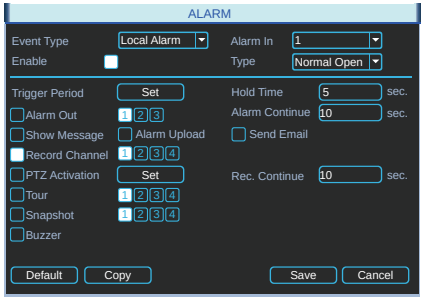
The upper portion of this window is used to choose an alarm, its configuration and its type.

Event Type – Choose between **Local** and **Remote** input. Remote input must be connected through an IP camera.

Alarm In – Select the alarm channel you are configuring.

Enable – When this is selected the alarm response(s) in the bottom portion of this window are enabled.

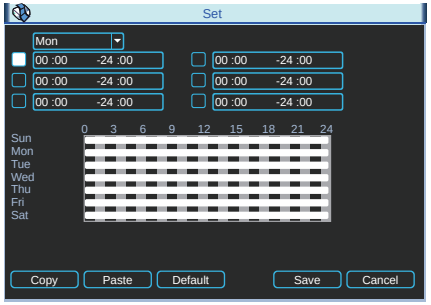
Type – Alarms are either Normally Open (NO) or Normally Closed (NC)



PICTURE 6-3

The bottom portion of the window allows you to choose what actions the DVR will initiate when an alarm is activated along with scheduling when the alarms are active.

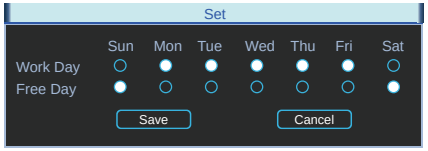
Trigger Period – This is for setting the schedule for when alarms are active. Clicking the **Set** button opens up a new window. Its operation is exactly like the setting window used to schedule motion detection and covered in **Section 3.4**.



PICTURE 6-4

You can set the schedule in up to six blocks of time for specific days of the week or by weekday and weekend.

Clicking the **Set** button next to the day drop down allows you to specify which days are work days and which are not.



PICTURE 6-5

Hold Time – This is the length of time you want the system to delay before beginning recording on an alarm.

Alarm Out – This will send an alarm signal to up to three connected external alarms when enabled.

Alarm Continue – This is the time that the DVR will wait before starting a new event (10 seconds to 300 seconds (5 minutes)) after the alarm is ended.

Show Message – When this is enabled, an alert message will be displayed on the DVR's screen.

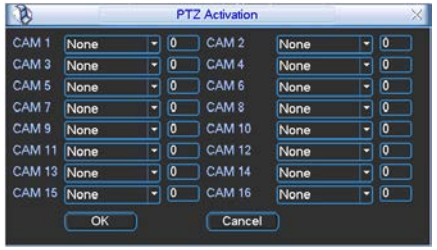
Show Message – When this is enabled, the system will bring up the **Alarm Status** window whenever an event is detected. You can configure this to display when motion, video loss or masking is detected.

Alarm Upload – The system can upload the alarm to the network including an alarm monitoring service.

Send E-mail – E-mail notifications can be sent a single e-mail address. Please see the **Section 1.2 Advanced Network Setup** in the **Remote Monitoring Guide** for instructions on how to set up the e-mail alerts including recipient address.

Record Channel – When one camera detects an event, you can set the DVR to activate recording on other cameras.

PTZ Activation – If you have Pan-Tilt-Zoom cameras connected to the DVR, you can cause them to be activated when an alarm occurs. You can further instruct it to perform one of 255 pre-set activities. You can also allow a delay of 0 to 300 seconds before the PTZ camera(s) activates. Setting up these pre-programmed functions is covered in **Section 5.2 PTZ Control and Setup**.


PTZ Activation
CAM 1 None 0 CAM 2 None 0
CAM 3 None 0 CAM 4 None 0
CAM 5 None 0 CAM 6 None 0
CAM 7 None 0 CAM 8 None 0
CAM 9 None 0 CAM 10 None 0
CAM 11 None 0 CAM 12 None 0
CAM 13 None 0 CAM 14 None 0
CAM 15 None 0 CAM 16 None 0
OK
Cancel

PICTURE 6-6

Tour - When enabled, this causes the DVR's display to cycle through selected Live View channels while maintaining the selected recording functions. Instructions for configuring this feature are found in the **Motion Events** menu as shown in **Section 3.4 Recording**.

Snapshot - When this is selected, the DVR will begin recording still images, in addition to whatever video is being recorded, and it will upload or e-mail these images as configured in in the **Motion Events** menu as well.

Buzzer - When enabled, the DVR will sound an audible alert when an alarm is triggered.

IMPORTANT! When you have completed your setup in the **Alarm** menu, you should also review your settings in the **Record Settings** menu to enable any other desired alarm-related features.

HARD DISK DRIVE

CHAPTER 7

Your DVR uses a standard computer A/V-rated SATA (Serial Advanced Technology Attachment) hard disk drive and will support up to a 3TB (terabytes) drive. These drives are the current industry standard and may be purchased wherever computer parts are sold. Depending on where you purchased your DVR, it may come with a pre-installed drive. But, we recognize that you may wish to upgrade or replace your drive in the future so this DVR is designed to make installation and replacement easy for the average user.

It should be noted that while this and the battery are the only user-serviceable parts within the case, and you will not void your warranty by installing or upgrading your hard disk drive, care must be taken to avoid damage to the other components within the case.

WARNING! ELECTRIC SHOCK RISK!

The DVR **MUST** be unplugged from all power sources as well as from the cameras before opening the case. Failure to do so can result in damage to the DVR or its components as well as injury or death.

7.1 INSTALLATION/REMOVAL

It is strongly advised against opening the case when atmospheric conditions present the risk of static discharge which can damage electronic components.

Whether installing the drive for the first time or removing the old one to install a new one, the steps are largely the same:

STEP 1. Disconnect the DVR from the power source as well as any other connections.

PICTURE 7-1

STEP 2. Loosen the cover screws on the rear and side panels.

PICTURE 7-2

STEP 3. Insert four screws into the mounting holes on the hard drive. DO NOT fully tighten, but give three twists each.

PICTURE 7-3

STEP 4. Line up hard drive mounting screws with mounting holes at the bottom of the DVR and slide the hard drive to move the screws to the narrow part of the holes.

PICTURE 7-4

STEP 5. Carefully turn DVR over taking care not to allow the drive to slide out.

PICTURE 7-5

STEP 6. Tighten the mounting screws firmly.

PICTURE 7-6

STEP 7. Flip the DVR right side up and connect the data and power cables to the hard drive.

PICTURE 7-7

STEP 8. Replace the cover onto the DVR.

PICTURE 7-8

STEP 9. Secure the screws in the rear and side panels.

7.2 CALCULATING THE RECORDING CAPACITY OF A HARD DISK DRIVE

While the physical data capacity of a hard drive is fixed, how much video you can record upon it depends on your recording configurations. Higher quality recordings will take up more space on the drive and setting the DVR to record for more frequently will fill it up more rapidly.

To determine the optimal capacity for your purposes, the chart below to estimate the size of hard drive that you'll need.

VIDEO FORMAT	RESOLUTION	FRAME RATE (FPS)	VIDEO QUALITY	BIT RATE (kbps)	SPACE USED (MB/h)
NTSC	CIF	30	Highest	1M	465
			Higher	768k	297
			Medium	512k	230
			Low	384k	173
			Lower	256k	115
			Lowest	128k	56
	D1		Highest	2M	910
			Higher	1.5M	712
			Medium	1M	468
			Lower	768K	297
			Lowest	512K	241
PAL	CIF	25	Highest	1M	466
			Higher	768k	295
			Medium	512k	235
			Low	384k	175
			Lower	256k	112
			Lowest	128k	56.4
	D1		Highest	2M	915
			Higher	1.5M	700
			Medium	1M	465
			Lower	768K	297
			Lowest	512K	241

The formula for calculating the required disk space is:

Total Recording Capacity = Used space per hour (MB/h) x Recording time (hour) x number of channels

Example: A customer is using the NTSC format (30 frames per second), CIF resolution with video quality set to Lowest and a total of 16 Channels. He wants the unit to record continuously for a month. Therefore, the calculation will look like this:

56(MB/h), x 24 (hours/day) x 30 (days) x 16 (channels) = 645,120MB or 650GB

Installing a 750GB SATA hard drive should provide enough space for one month's continuous recording time at those settings.

APPENDIX

A.1 TROUBLESHOOTING

1. **The DVR does not boot up properly** ***Possible Causes:***
   a. Input power is not correct, check power supply.
   b. Power switch button is damaged.
   c. Updated firmware using wrong file.
   d. Hard drive malfunction or something wrong with hard drive cable.
   e. Front panel error.
   f. Main board is damaged.

2. **DVR often automatically shuts down or stops running.** ***Possible Causes:***
   a. Input voltage is not stable or it is too low.
   b. Hard drive malfunction or something is wrong with the cable.
   c. Device is not getting enough power.
   d. Front video signal is not stable.
   e. Working environment is too hot, or too much dust.
   f. System board malfunction.

3. **System cannot detect hard drive.** ***Possible Causes:***
   a. No hard drive is installed
   b. Hard drive is damaged.
   c. Hard drive cable connection is loose.
   d. Main board SATA port is damaged.

4. **There is no video output to one or more channels.** ***Possible Causes:***
   a. Updated firmware using wrong file.
   b. Brightness is 0. Please restore factory default setup.
   c. There is no video input signal or it is too weak.
   d. Check privacy mask setup.
   e. Combo DVR hardware malfunctions.

5. **Real-time video color is distorted.** ***Possible Causes:***
   a. When using BNC output, NTSC and PAL setup is not correct. The real-time video becomes black and white.
   b. DVR and monitor resolution settings are not compatible.
   c. Video cable is too long signal is becoming degraded.
   d. Combo DVR color or brightness setup is not correct.

6. **Cannot search local records.** ***Possible Causes:***
   a. HDD ribbon is damaged.
   b. HDD has failed.
   c. The recorded file has been overwritten.
   d. Record function has been disabled.

7. **Video is distorted when searching local records.** ***Possible Causes:***
   a. Video quality setting is too low.
   b. Program read error, bit data is too small. There is mosaic in the full screen. Please restart the DVR to solve this problem.
   c. Hard drive data cable error.
   d. Hard drive malfunction.
   e. DVR hardware malfunction.

8. **There is no audio when monitoring.** ***Possible Causes:***
   a. Channel with audio is not full screen, make the channel you want to hear audio on full screen.
   b. Audio cable is damaged.
   c. Combo DVR hardware malfunction.

9. **There is audio when monitoring but there is no audio when system plays back.** ***Possible Causes:***
   a. Setup is not correct. Please enable audio function
   b. Corresponding channel has no video input. Playback is not continuous when the screen is blue.

10. **Time display is not correct.** ***Possible Causes:***
    a. Setup is not correct
    b. Battery contact is not good or voltage is too low. Replace battery.
    c. Crystal is broken.

11. **Motion detection function does not work.** ***Possible Causes:***
    a. Period setup is not correct.
    b. Motion detection zone setup is not correct.
    c. Sensitivity is too low.

12. **Cannot log in client-end or web.** ***Possible Causes:***
    a. For Windows 98 or Windows ME user, please update your system to Windows XP or later.
    b. ActiveX control has not been enabled.
    c. Video card driver on computer may need to be upgraded.
    d. Network connection error.
    e. Network setup error.
    f. Password or user name is invalid.

13. **There is only mosaic no video when previewing or playing back video file remotely.** ***Possible Causes:***
    a. Network bandwidth is not sufficient.
    b. Computer does not have enough resources to handle video flow.
    c. There is multiple-cast group setup in combo DVR. This mode can result in mosaic. Usually we do not recommend this mode.
    d. There is privacy mask or channel protection setup.
    e. Current user does not have monitoring rights.
    f. Combo DVR local video output quality is not good.

14. **Network connection is not stable.** ***Possible Causes:***
    a. Network is not stable.
    b. IP address conflict.
    c. MAC address conflict.
    d. PC or combo DVR network card is not good.

15. **Burn error /USB backup error.** ***Possible Causes:***
    a. System uses too much CPU resources. Try stopping recording first and then begin backup.
    b. Data amount exceeds backup device capacity. It may result in burner error.
    c. Backup device is not compatible.
    d. Backup device is damaged.

16. **Remote control does not work.** ***Possible Causes:***
    a. Need to enter the correct Device ID on the remote control.
    b. Distance is too far or control angle is too wide.
    c. Remote control battery power is low.
    d. Remote control is damaged or DVR front panel is damaged.

17. **Can not playback the downloaded file.** ***Possible Causes:***
    a. There is no media player.
    b. Need Divx Codec in file player

18. **Forgot local menu operation password or network password**
    a. Contact Q-See tech support and we can generate a new password for the unit.

Minimum required configuration of a PC for remote connection:

COMPONENT	MINIMUM REQUIRED
CPU	Intel P4 2.8G minimum or later Intel processor or equivalent
HDD	250GB minimum
RAM	1GB minimum
VGA	Supports MOST* AGP and PCI-E Video Cards with 128MB of RAM or more with full Direct Draw support. *Some newer PCI-E cards are not yet supported
OS	Windows XP(SP2 above) /VISTA/7
DIRECTX	9.0

Minimum PC configuration for 4-channel real-time remote access with fully open mainstream channel:

PC MODULE	PARAMETERS
CPU	Intel Core™2 Duo CPU E4600 or equivalent
HDD	8200G
RAM	1GB
VGA	GMA3100/NVIDIA GeForce 8400/ ATI RADEON HD3450 Full Direct Draw Support with 512MB Video RAM
OS	Windows XP(SP2 above) /VISTA/7
DIRECTX	9.0

WARNING! Do not turn the system power off during the upgrade process! Doing so may damage the chipset and prevent the DVR from starting.

A.2 SPECIFICATIONS

Parameter		QC484	QC448	QC4316
COMPRESSION	Compression Format	Standard H.264 Baseline		
VIDEO	Video In	Composite 1.0V p-p/75Ω, BNC x 4	Composite 1.0V p-p/75Ω, BNC x 8	Composite 1.0V p-p/75Ω, BNC x 16
	Video Out	VGA x 1, BNC x 1		
	Resolution	1280x1024, 1280x720, 1024x768, 800x600		
	Display Frame Rate (per camera)	704x480 at 30FPS (NTSC) or 25FPS (PAL)		
	Record Resolution	D1: 720×480 (Channel 1 & 2 only) CIF: 352×240		
	Record Frame Rate (per camera)	NTSC: D1 7.5FPS (single channel 30FPS) CIF 30FPS PAL: D1 6.25FPS (single channel 25FPS) CIF 25FPS		
AUDIO	Audio Input	1 channel, RCA(200-2800mV, 30KΩ)		
	Audio Output	1 channel, RCA(200-3000mV, 5KΩ)		
ALARM	Alarm Input	None		
	Alarm Output	None		
STORAGE	Record Mode	Manual/Sensor/Timer/Motion Detection		
	Multi-Function	Simultaneously Record, View Live or Recorded Video, Playback, Back-up files, Monitor Remotely		
INTERFACE	Network Interface	RJ45 (LAN, Internet)		
	Communication Interface	RS485, USB 2.0 x 2 (One for Backup, One for USB Mouse)		
CONTROLS	PTZ Control	Yes		
	Remote Control	Yes		
DISK INFO	Disk Type	SATA x 1 (up to 3TB)		
OTHER INFO	Voltage	12V2A		
	Optimal Temperature	50°F to 104°F 10°C to 40°C 10% to 90% Humidity		
	Power Consumption	10W	20W	10W

Parameter		QC524	QC588	QC5416
COMPRESSION	Compression Format	Standard H.264 Baseline		
VIDEO	Video In	Composite 1.0V p-p/75Ω, BNC x 4	Composite 1.0V p-p/75Ω, BNC x 8	Composite 1.0V p-p/75Ω, BNC x 16
	Video Out	VGA x 1, BNC x 1, HDMI x 1		
	Resolution	1920×1080, 1280×1024, 1280×720, 1024×768		
	Display Frame Rate (per camera)	704x480 at 30FPS (NTSC) or 25FPS (PAL)		
	Record Resolution	960H: 960x480 D1: 704×480 CIF: 352×240		
	Record Frame Rate (per camera)	NTSC: 960H & D1 30FPS PAL: 960H & D1 25FPS		
STORAGE	Record Mode	Manual/Timer/Motion Detection		
	Multi-Function	Simultaneously Record, View Live or Recorded Video, Playback, Back-up files, Monitor Remotely		
INTERFACE	Network Interface	RJ45 (LAN, Internet)		
	Communication Interface	USB 2.0 x 2 (One for Backup, One for USB Mouse)		
CONTROLS	Remote Control	Yes		
DISK INFO	Disk Type	SATA x 1 (up to 4TB)		
OTHER INFO	Voltage	12V 2A		
	Optimal Temperature	50°F to 104°F 10°C to 40°C 10% to 90% Humidity		
	Power Consumption	10W		

Parameter		QC304	QC308	QC3016
COMPRESSION	Compression Format	Standard H.264 Baseline		
VIDEO	Video In	Composite 1.0V p-p/75Ω, BNC x 4	Composite 1.0V p-p/75Ω, BNC x 8	Composite 1.0V p-p/75Ω, BNC x 16
	Video Out	VGA x 1, HDMI x 1		VGA x 1, BNC x 1, HDMI x 1
	Resolution	1920×1080, 1280×1024, 1280×720, 1024×768		
	Display Frame Rate (per camera)	704x480 at 30FPS (NTSC) or 25FPS (PAL)		
	Record Resolution	D1: 704×480 2CIF: 704x240 CIF: 352×240		
	Record Frame Rate (per camera)	NTSC: D1 15FPS, 2CIF & CIF 30FPS PAL: D1 6.5FPS, 2CIF & CIF 25FPS		NTSC: D1 (2CH) 30FPS, 2CIF & CIF 30FPS PAL: D1 (2CH) 25FPS, 2CIF & CIF 25FPS
STORAGE	Record Mode	Manual/Timer/Motion Detection		
	Multi-Function	Simultaneously Record, View Live or Recorded Video, Playback, Back-up files, Monitor Remotely		
INTERFACE	Network Interface	RJ45 (LAN, Internet)		
	Communication Interface	USB 2.0 x 2 (One for Backup, One for USB Mouse)		
CONTROLS	Remote Control	Yes		
DISK INFO	Disk Type	SATA x 1 (up to 4TB)		
OTHER INFO	Voltage	12V 2A		
	Optimal Temperature	50°F to 104°F 10°C to 40°C 10% to 90% Humidity		
	Power Consumption	10W		

Q-SEE PRODUCT WARRANTY

Q-See is proud to back all of our products with a conditional service warranty covering all hardware for 12 months from the date of purchase. Additionally, our products also come with a free exchange policy that covers all manufacturing defects for one month from the date of purchase. Permanent upgrading service is provided for the software.

Liability Exclusions:

Any product malfunction or abnormalities in operation or damage caused by the following reasons are not within the free service scope of our company:

1. Equipment damage caused by improper operation.
2. Improper equipment operation environment and conditions (e.g., improper power, extreme environmental temperatures, humidity, lightning and sudden surges of electricity).
3. Damage caused by acts of nature (e.g., earthquake, fire, etc).
4. Equipment damage caused by the maintenance of personnel not authorized by Q-See.
5. Product sold over 12 months ago.

In order to fulfill the terms of your warranty, you must complete the registration process after purchasing our product. To do this, simply fill out the User's Information Card on our website at www.Q-See.com

QUESTIONS OR COMMENTS? CONTACT US

PRODUCT SUPPORT, DOWNLOADS, FIRMWARE UPDATES & MANUALS

24/7 Technical Resources
Live Chat (M-F, 9-5 PST)
www.Q-See.com/Support

simplicity - quality - technology

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